# The Journal of the American Medical Association

VOL. XXVIII. CHICAGO, ILL., JANUARY 2, 1897. No. 1.


## ORIGINAL ARTICLES.

### EXAMINATIONS IN MEDICINE.

AN ENQUIRY INTO THEIR INFLUENCE UPON MEDICAL EDUCATION AND THE BEST METHODS OF CONDUCTING THEM.

Read at the Second Pan-American Medical Congress, Mexico, Nov. 16, 1896.


BY C. H. ALDEN, A.M., M.D.

ASST. SURG. GENERAL U. S. ARMY, PRESIDENT ARMY MEDICAL SCHOOL. WASHINGTON, D. C.


My subject, that of examinations for medical men, can not fail to have engaged the attention, the very earnest attention, of each one of us at some period of our career. All of us have undergone the trial. Some of the younger physicians present may even now have recently passed through some such ordeal or are about to do so, and none of us are so old as not to have lively recollections of our experiences in this regard.

It has been said that the present is an age of examinations. They have without doubt become greatly multiplied in recent times, and the reason is not difficult to find. The rapid expansion of the bounds of human knowledge leading to widened and prolonged preparation for the professions, especially that of medicine; the institution of the Civil Service, aiming to fill offices by merit and not by favor; increased competition, have all naturally led to more numerous and severer tests of proficiency and fitness.

The attainment of the degree of Doctor of Medicine and entrance upon the practice of the profession are guarded among all advanced peoples and civilized nations by a careful examination into the qualifications of the candidate. Nor would we have it otherwise. The student and candidate of today becomes the practitioner and teacher of tomorrow, and while the former feels the pressure of the ordeal he is undergoing, the latter feels the importance both to the body of which he is a member and to the community at large of thoroughness and care in the selection of those who are to be admitted to the responsibilities and duties of the practicing physician.

The subject of examination needs to be looked at from two points of view, the point of view of the candidate and that of the examiner, and they are naturally very different. The examination presents diverse aspects as regarded by the two classes most directly interested. Much of the strain experienced by those undergoing examination for medical positions is unavoidable because inseparable from the circumstances under which the examinations are held. The candidate can not divest himself of the importance to his future career of the result at stake. He is perhaps competing for the degree which is to mark his entrance into the profession and to which he has devoted years of hard work; for one of the much sought hospital appointments with its opportunities for professional improvement; for some municipal or State position with its fixed and certain compensation; for license under the State Board, or for entrance into one of the National Services, the Army, the Navy, etc., which service may have for him special attractions. The candidate can not forget the importance of the occasion, and this necessarily makes it a most anxious one. It comes, too, usually at an age when calmness and self-control have not yet been acquired and are hardly to be expected.

Nor, it must be remembered, does all the strain and labor fall to the share of the candidate. The examiner has his full share, if he faithfully execute his most delicate and responsible duty. As we shall see more particularly hereafter, his part requires careful preparation as well as the exercise of patience, tact and sound judgment.

Let us look into the methods of medical examination now in use. Let us inquire how they can be best adapted to fulfill the end in view, to accomplish the purpose for which they were instituted, the selection of competent men, and how, while fulfilling adequately this purpose, unnecessary strain and labor upon the examiner and examined may be avoided. Our investigation may, it is hoped, clear up some misunderstanding on the part of those presenting themselves for examination as to its scope and their true relation to the persons who are conducting it. If this can be done and the two parties concerned be put more *en rapport*, a highly desirable result will be effected.

The examinations of the undergraduates in medicine and those held at the end of his course for his degree, first claim consideration. Of late, both in this country and abroad, the view has been advanced that these medical examinations as now conducted have an injurious influence upon the preparation of the candidate for his future work, that they lead to the habit of cramming and memorizing facts as laid down in books. It is said that the importance of examination has become so much exaggerated that the student thinks the thing to be attained is passing the examination rather than the acquirement of sound knowledge and practical training; that even if facilities for practical work are given the student, his mind is ever on the necessity of preparation for the examination ahead, rather than on the careful observation of the clinical cases and of the prosecution of the practical work at hand. It is feared that the present system loses sight to some extent of the true function of medical instruction, which is not so much to fill the student with knowledge as to train his mind, his hand and all his senses, and to bring him into actual contact, under guidance, with the diseases, injuries and emergencies that he may hereafter be called upon to treat.

Jonathan Hutchinson, late President of the Royal College of Surgeons, has pointedly drawn attention to this in his address before the Liverpool Medical Col-

lege in October, 1895, on examinations as an aid to education. He says:

"The scope of the examination in prospect has been all-powerful in determining that of the previous course of study. 'This I shall want'; 'that I shall not be asked,' have been the ever-present motives in the selection of subjects for reading and thought. Whatever was deemed not likely to be questioned about has been ruthlessly put aside, whatever its intrinsic interest. The demands of the examiner set the pace of study, and the breadth of the examination determines the narrowness, or otherwise, of the student's education."

Mr. Hutchinson advocates, in order to reduce the evils of which he complains, the substitution of written for oral questions, and the institution of objective or practical examinations as far as possible. He makes the rather novel suggestion that the written questions should not be prepared by the examiners nor at the time of examination, but carefully framed in advance and published in volumes, the number of questions to cover the ground very extensively and to be largely in excess of the needs of any one examination; that from these volumes the desired questions be selected. He thinks this system would lead to more patient and careful testing of qualifications; since examiners are usually very busy men and can not give sufficient time to this important task. He further advocates the so-called divided examinations; the examinations being held along through the student's course and not crowded into one short period at the close.

Mr. T. Pridgon Teale, F.R.C.S, Member of the General Medical Council of Great Britain, introduced a resolution at a meeting of that body in June last advocating a change in its methods of examination. He supported it by some forcible remarks upon the need of reform. He stated that the number of rejections had been doubled in the last twenty years, and the stringency of examinations greatly increased, and that these rejections brought no corresponding advantage to the profession, while they added unnecessarily to the time and expense required to pass the ordeal. He believes that examinations are too exacting and that unsuitable questions are asked, that the examinations are too hurried and hence an element of chance has been introduced, that "good men fail to pass and unfit men, from a talent for cramming, manage to answer questions a little too well to justify rejection." He dwells on the interference with clinical work and practical training which results from the necessity for preparing for these numerous examinations. "Students," he says, "are overworked and badly worked."

Mr. Tobin of Dublin, in an address delivered at St. Vincent's Hospital, 1895, speaks in a similar vein.

Sir William Stokes describes the examination ever impending and kept in constant mind by the student as "the sword of Damocles."

Articles have appeared in some American journals drawing attention to this subject. A writer in the *New York Medical Journal*, June 20, 1896, says: "Examinations are directed too much to finding out what a man's stock of memorized facts amounts to and too little to finding out how far he has learned the art of studying by himself and how well qualified he is by natural gifts."

It may be that the evils complained of do not exist to the same extent in the United States as in Europe, yet the remarks of the eminent physicians and teachers quoted give valuable warning of dangers to be avoided, and suggest possible improvements of our methods.

Let us consider the most important points as to methods used. Although my remarks on this subject are naturally based on experience gained on boards of examination of young medical men applying for admission to the medical staff of the army, they will for the most part, it is believed, be applicable to medical examinations in general. I desire to say briefly here that the method pursued in the army examinations have been evolved from long experience of the department, examinations having been held from a very early period of its history. Although they are not perfect nor all that could be desired, still they combine, it is believed, the most important elements, are practical as well as theoretical and accomplish the ends in view quite as satisfactorily as can perhaps be expected under existing circumstances.

In the first place it is important that the scope of a medical examination shall be so arranged as to determine the fitness of the candidate for the particular position or duties in question and not for any other. The examination for the degrees is designed simply to test the candidate's thorough acquaintance with the branches taught in the college curriculum and to ascertain if he has availed himself faithfully of the practical advantages afforded him. Examination in outside or preliminary branches should come at the beginning of his medical career, though it too often is not required at all. Neither in this nor in the examination for hospital appointments is it desirable to go into the literary or physical qualifications of the candidate.

The conditions are different as regards the medical staff, and these conditions are sometimes not understood by medical gentlemen applying for admission. The service may require exposure to extremes of heat and cold and to great fatigue, and the young medical officer must be thoroughly able to do duty under all circumstances. The government in appointing a medical officer takes him for life, if he desires to stay and is worthy of being retained, and it is essential that he shall be not only sound in health at the time, but free from any defect or incipient disease that is likely to disable him and render him useless and a burden upon the nation. A very considerable number of candidates find themselves thrown out by the physical examination who might be spared the expense and trouble of presenting themselves had they appreciated the necessity of a thoroughly good physique. Persons have been known to present themselves for examination with gross defects such as hernia, anchylosed joints, mutilated hands and serious defects of vision and hearing.

The preliminary examination of candidates for the medical staff in subjects of general education, such as arithmetic, geography, history and literature, has sometimes excited surprise. It seems to some not only unnecessary, but almost an indignity to subject a medical man to such an ordeal. It is to be remembered, however, that the army examination is practically open to all graduates and that the possession of a degree in medicine does not, under the present system of medical education in the United States, guarantee the amount of liberal cultivation or even of general information, which all will agree is essential for a scientific man. The army medical man becomes the associate of educated men, of officers who have

been trained at West Point, and it is clearly important he should be a man of equal culture.

The preliminary examination referred to is intended to ascertain this and does not require special preparation. It is not too much to ask, for instance, that the candidate shall be able to add and subtract fractions and understand the rule of three, that he shall have at least some knowledge of his own country and of the more important geographic features beyond these limits; that, for instance he does not locate Plymouth Rock on the coast of Virginia, nor the city of Vera Cruz on the coast of Peru; has a generally correct idea of the origin and course of the Mississippi River and can locate the Mediterranean Sea, etc. He ought not to complain if required to give at least a general idea of the most important events in the history of his country and of the world, such as the Declaration of Independence, the war of 1812, the reign of Queen Elizabeth of England or the battle of Waterloo. To say, as a candidate has been known to do, that at the great engagement referred to, George Washington was in command of one of the opposing armies, is certainly hardly allowable. Of literature, too, the candidate is expected to have such a knowledge as a gentleman acquires in ordinary reading. He should at least know the names and chief works of prominent authors. Certainly a physician can lay no claim to be an educated man if he knows nothing of Shakespeare, of Milton, of Cervantes, of Molière, of Schiller, of Prescott, of Longfellow, etc., and yet such ignorance is occasionally found among candidates for the medical staff.

If the medical colleges of the country held a preliminary examination before matriculation and required a certain standard of general education to be attained, as some colleges now do, and as it is hoped all eventually will, this inquiry into the preliminary education might be waived in the case of applicants for the army medical service. The day will probably come when a degree in the arts may be required of all candidates as is now done for entrance to the Johns Hopkins Medical College, but at present it is not possible.

It is much to be desired that the time of the examiners and of the candidates should not be taken up by such non-medical branches, but devoted to medicine and surgery alone. As a step in this direction the applicant for the army medical staff is now allowed, if he desires it, to take his physical and preliminary examination at some military station near his home under the supervision of the post medical officer. A considerable number of applicants are thereby saved unnecessary expense and disappointment.

The plan of dividing the examination for the medical degree, already practiced, it is understood, in some countries of Europe and in Mexico and Cuba, and now coming into use in the United States, so that examinations are held during the course instead of being crowded together at the end, is believed to be a good one. Medical education now extends over so large a field and so long a period that such division of the examination seems almost necessary. It has the advantage of giving more time and therefore more thoroughness to each examination and lessens the strain upon the candidates. In army examinations it is impracticable to any great extent, but the preliminary examination referred to, held near the candidate's home, partially carries out the idea.

The question of the relative value of written and oral examinations is one that has received much attention and excited much discussion. In former times the oral was the usual method, but in late years as competition has increased and the necessity for closer scrutiny has arisen the written examination has come more and more into favor. There can be no doubt that the written examination has many advantages. It is in many respects a fairer test, as thereby the candidate is placed more at his ease and is better able to show what he knows than under the excitement and hurry of oral questioning. It largely eliminates the element of nervousness and puts the diffident man and the confident one more nearly on an equality. It affords the best means of determining the comparative merits of several candidates who may be examined together, since all are given the same questions. Granting these advantages to the written method, the oral examination can not, for army examinations at least, be wholly abandoned. By it the examiner is brought into close personal contact with the candidate, can insist on direct answers to his questions, can ascertain if the applicant is certain of his answers and his reasons therefore, can better estimate how much he simply remembers and how much he carries with him for use, can test his presence of mind and thus better judge the young man's capacity for the work he may be called on to do. A combination of the written and oral methods is for the reasons stated the best, and is now practiced in the examinations for the army.

The way in which either mode of examination is carried out is perhaps of more importance than the choice between them. It is highly important that the questions, either written or oral, should be planned with great care. It will not do to leave their preparation until the time of the examination, as they are then apt to be hastily and carelessly framed and to repeat too frequently questions already asked. It may well take almost as much pains and time for the examiner to prepare his written questions as for the candidate to answer them. The art of question making is by no means a natural gift or one that can be taken up by any one without study. It costs time and labor to select questions so that they shall well cover the various divisions of the subject, and to frame them so that they shall be clear and promptly understood by the candidate, call for exactly what the examiner desires to know and not invite too discursive writing whereby the candidate may try to hide his ignorance of the main point. A good plan is to prepare, for weeks in advance and at one's leisure, numerous written questions extended over a wide field so that all the important branches of the subject may be represented and then at the time of examination to select and arrange a set containing the desired number.

No advantage is seen in the plan adopted in some medical examinations of placing before the candidate a number of questions from which he is allowed to select and required to answer a certain percentage. The privilege of such selection favors the candidates least well prepared and in a competitive examination prevents any exact judgment of the relative merits of the written answers.

The examination by oral questions requires equal care exercised in a somewhat different way. The examiner should prepare himself beforehand and have by him a memorandum of the topics upon which he intends to question. If he does not do this he is sure to repeat himself. The examiner's favorite questions

soon become known to intending candidates and are specially prepared for. The greatest tact is necessary in the conduct of an oral examination, a tact born of right feeling but attaining its highest development only by cultivation. The questioner's manner should be calm, quiet and courteous, have no appearance of hurry, and it need hardly be added he should avoid anything like trying to show his own superior knowledge or the candidate's ignorance. His object is to find out what the person under examination knows and to do this must put him under the circumstances most favorable for finding out. A great deal depends upon the way the oral examination is opened, upon the first question. A first question misunderstood may so confuse and puzzle the young man that it may be impossible to get anything intelligible out of him. The questions should be clear and definite, and generally, at first at least, call for brief and definite answers. To begin, as an excellent surgeon but tactless examiner has been known to do, by asking the candidate, "What do you know about the brain?" is simply to render the candidate almost incapable of reply. A wise plan is to spend a few minutes in general inquiries on matters not directly connected with the subject of examination and, if possible, to get the candidate fairly entered upon it, without his being conscious of beginning.

Of still greater importance is the subject of the practical or objective examination as it has been called as distinguished from the examination by written and oral questions. The development of the practical side of medical education, and the greatly increased attention paid to laboratory and clinical work in the curriculum of our medical colleges is a source of just pride and congratulation. We recognize now that it is not enough for the medical student to listen to lectures, he must not only be told what to do and how to do it, but trained in doing it under the instructor's guidance. Yet it is probable that our tests of his practical ability have hardly kept pace with the facilities afforded him for obtaining it and that professional examinations still bring out rather what a candidate remembers than what he can do. It is manifestly impossible, from the want of time and other circumstances surrounding an examination, to make actual practical tests of the young physician's ability to deal with all the conditions and emergencies which he may encounter hereafter. The examination by questions must necessarily still be largely depended on, yet it would seem possible to test his practical acquaintance with laboratory work, and to ascertain how he can diagnose and treat disease and injuries at the bedside, and perform operations on the cadaver, to a greater extent than is now practiced.

No one is now allowed to present himself for examination by the Army Medical Board unless he has at least one year's hospital experience or its equivalent in private practice. Practical tests are therefore an essential part of the work of the Board, the candidate being required to examine patients at the bedside, and his method of diagnosis and treatment carefully scrutinized. The performance of operations on the cadaver is also required. It has not infrequently happened that an applicant for the medical corps has passed successfully the written and oral examinations but has shown at the bedside or in the operating room such unreadiness for practical work as to cause his rejection.

This paper can hardly close without some suggestions for the special benefit of the person who is under examination.

First as to the candidate's preparation. It may be said that a thoroughly qualified physician needs no preparation; still the candidate, if he has time, will prudently look into the requirements as far as he may be able to discover them. It is generally easy to do so, as these requirements are often fully made known in advance and sample questions published. He should then endeavor carefully to meet these requirements, to supply his defects and honestly to qualify himself not only to pass the required examination but for the career he hopes to enter upon. This is a very different thing from cramming to answer the questions that may be propounded. Special instructions and special courses so far as they add to the candidate's knowledge and his practical skill are good and valuable. If their purpose is simply to enable the candidate to pass an examination, to stuff him full of the answers to questions that are known to have been asked by previous boards and may therefore be asked again, without reference to his general training, they are bad and useless. The tendency of most persons who make a business of preparing candidates for examinations is to train too fine, so to speak, to magnify the importance of their help by crowding the student with a mass of minutiæ and valueless detail, neglecting the general principles and wider knowledge which is not only of the first importance but more likely to be of use at the examination.

In presenting himself for examination the candidate should stand squarely on his own merits; an introduction to a member of the board is well enough but voluminous and extravagant recommendations do harm rather than good. It is well known that they are to be had for the asking and have therefore but little weight. Reliance upon such outside influence is apt to make the examiner think it is needed. Politics and social influence have no weight in determining the candidate's success or failure. Let him enter the examination with a determination to do the best he can and to appear exactly as he is without pretence or exaggeration. Let him remember the old proverb. "One can take out of a cask only what has been put into it," or as the Spanish forcibly put it, "La cuba siempre huele del vino que contuvo." It is true there are constitutionally timid men, but knowledge and practice give a confidence which nothing else will.

Further, let him not delude himself with the idea that success depends on luck and not on merit, for in proportion as he cherishes that opinion will sound preparation be neglected. He may have full reliance upon the fairness of the board, and should disabuse himself of the thought that examiners are unfriendly or are trying to puzzle him. It is quite the contrary. The board can have no possible object in rejecting a worthy candidate. The very object of their appointment is to obtain, not to exclude men.

The questions given out, especially those requiring written answers, are usually framed with care and demand definite answers. Their purport should be studied carefully and exact answers given without guessing or hedging. A diffuse reply upon some side topic to cover up ignorance upon the main one, is a waste of time and deceives no one. The candidate will as an honorable man accept no aid from comrades or memoranda, even if he is not prevented from doing so.

A serious mistake often made by gentlemen under examination is that of studying hard just before and during the intervals of the examination. The man who during examination week sits up all night to supply his supposed defects not only does not add to his stock of permanent and useful knowledge but usually brings on such a state of nervous confusion and strain that he can not call up the knowledge he actually has. It is of the first consequence for success under an examination, especially a prolonged examination, that the candidate should have a clear head. Overwork at the time of examination, largely self-imposed as I have indicated, is by no means a small factor in the failure of well-trained and promising candidates.

The points to which I would in conclusion draw especial attention are as follows:

That medical examinations as now conducted often have an injurious effect upon the student's preparation, leading to cramming and interfering with practical work.

That for life positions, such as the army medical staff, an examination into physical condition is necessary; and under the existing requirements of medical colleges, in general education also; that examinations should be held at the close of instruction in each subject and not altogether just before the degree is given.

That in the examinations by questions, both the written and oral methods should be practiced, each having distinct advantages, and that the preparation of questions requires great care.

That practical tests of the candidate's readiness for his future work are of the highest importance, being probably still too much neglected.

That the preparation of the candidate should be for the position rather than for the examination, that he should rely on his own merits and not on influence, trust to the fairness of his examiners and avoid all extra work at time of the ordeal.

## FRENKEL'S TREATMENT OF ATAXIA BY MEANS OF EXERCISE.

BY BOERNE BETTMAN, M.D.

PROFESSOR OF OPHTHALMOLOGY AND CLINICAL OTOLOGY, COLLEGE OF PHYSICIANS AND SURGEONS, CHICAGO.

Heiden, Switzerland, situated 2,500 feet above the sea level, overlooking the beautiful Lake Constance and the five cantons bordering it, formerly had the reputation of being a whey cure. It became especially popular through the annual visits of Albrecht Von Graefe, the so-called "Father of Ophthalmology," who sought rest and recreation among its peaceful hills. A horde of patients and medical disciples followed in his wake, so that it soon became the Mecca for oculists and afflicted ones seeking their aid. Its excellent location, its salubrious climate and its hotel facilities induced Dr. Frenkel to select it for his field of work during the summer.

During a seven weeks' sojourn at Heiden this summer, I had an opportunity, through the courtesy extended me by Dr. Frenkel, of observing daily his new method of treating locomotor ataxia due to tabes dorsalis. So excellent were some of the results obtained under my personal observation, that I thought it would interest American physicians to know of Frenkel's method of correcting one of the most annoying disturbances of tabes; the one, at least, which interferes most seriously with the ordinary routine of life, namely, the ataxia.

A vast number of therapeutic measures have been introduced to combat the disease. They have been summarized by such universal writers as Leyden and Erb as, the "mercurial treatment (which, in Erb's opinion, ranks first in importance, since over two-thirds of 700 cases of tabes dorsalis reported by him were due to syphilis); treatment by internal medication, as for instance silver nitrate; injections of animal extract *à la* Brown-Séquard; thermal baths such as Oeynhausen, Nauheim, Kissingen, Aix; hydrotherapeutics; sea baths; Kneip's cure; massage; electrotherapeutics; nerve stretching of Langenbach; suspension, introduced by Motschutkowski; orthopedic treatment of Hessing," etc. The mere fact that so many methods of treatment are in vogue, is sufficient proof that none is satisfactory, and this is the conclusion that is reached in the above mentioned monographs.

Frenkel, realizing how few were the cures effected by all the methods used, disregarded the disease proper and turned his attention to the correction of its most annoying feature. The method which he has so scientifically evolved is the result of an observation made during the treatment of one of his tabetic patients. At the first examination, the patient was unable to correctly perform the simple test of stretching out both arms and with closed eyes bringing the tips of the extended index fingers together. Much to Frenkel's surprise, at the second examination, a few weeks later, the patient performed the test admirably, and upon inquiry stated that he had repeatedly tried the movement at home. Frenkel related an amusing incident to me which bears on the matter in question. A now well-known professor of nervous diseases carefully prepared his maiden lecture and selected a number of tabetic patients to illustrate various ataxic movements. He inadvertently told the patients what special purpose they were to serve. The demonstration was a perfect failure, owing to the efficient manner in which the patients had overcome the ataxic movements through constant practice days before the lecture was delivered. The reason of the unsuccessful demonstration dawned upon the professor after hearing of Frenkel's method.

The thought that naturally arose in Frenkel's mind after observing his patient was: If one symptom due to incoördination can be cured, why not every one?

In the *Semaine Médicale*, March 25, 1896, appeared an article on "Cerebral Exercise," in which Frenkel states: "One of the fundamental properties of nerve tissue is to retain impressions made upon it. When these same impressions are frequently repeated, a permanent change is wrought in the nervous apparatus, which in the domain of association of ideas is translated as memory and in the domain of motor functions calls forth coördinated movements. It is thus that the physiologic rôle of habit, exercise, education is explained."

Coördination is acquired only after years of practice. Every single movement of the body is learned. We are born with a complete set of muscles, but how to use them each one must learn. The various movements of our body, even the simplest ones, call into play certain muscles and groups of muscles. Their harmonious action, directed by the senses, may be called "coördination" or coördinated action. Through practice this harmonious action, this coördination, can be increased to a marvelous degree. We need only cite the homely examples mentioned by Frenkel and Hirsch-

berg. The infant learning to walk; the child to play piano; the juggler; the tight-rope walker. The infant in his first attempts to walk is decidedly ataxic. The tight-rope walker performs his, to us less agile persons, difficult feats, only after having learned to bring into harmonious action the numerous groups of muscles required, directed by the different senses. Beginners in the art of writing, of dancing, of rope walking, are ataxic compared to experts.

All movements are controlled by the sense of sight and the muscular sense. The oftener any action is performed the more perfect its execution, and the more mechanical it appears. Finally the controlling influence of the sense of vision and the muscular sense is lost sight of, and the movement is termed automatic, as for instance writing, walking, playing an instrument. When, however, one of the controlling influences is disturbed or impaired, as for instance the muscle sense in tabes, the movements lose their *finesse*, become coarse or incoördinate. The other sense, that of vision, is called into play to enable the patient to gauge his movements to this means. It is well known that an ataxic person becomes more so when the controlling influence of vision is excluded by closing his eyes.

The ataxia of tabes is accounted for by Leyden,[1] by a loss or impairment of the sensibility. Erb and Charcot attribute it to a primary lesion of the center of coördination itself or its paths.

Frenkel believes that a mental or psycho-motor element plays an important rôle in coördinated movements, consisting of the idea of the act, the voluntary effort necessary to accomplish it, and the consciousness of having effected it. This being, according to Frenkel's idea, the physiologic action of coördination, he bases his therapeutic reëducation upon the same principle. By a series of graduated exercises the patient, by calling into play certain groups of muscles, stimulates certain nerve centers in which these movements originate, thus giving rise to what Frenkel terms *gymnastique cérébrale*.

Frenkel assumes that in but very few cases of tabes, an entire destruction of the sensory tract of the cord ensues. In the great majority of cases there are still bundles of the sensory fibers intact, whose functions have probably been annulled through a temporary pathologic change or by lack of use. Be that as it may, stimulation through gymnastics is intended to revive and possibly intensify their action. Leyden terms Frenkel's treatment compensatory treatment.

Attention is called to the great influence of the will power. This plays an important rôle in all exercises, and must never be lost sight of, either by the physician or by the patient.

Frenkel distinguishes three kinds of movements, 1, simple contractions of the muscle, such as extending or flexing a finger; 2, simple coördinate movements, more complicated movements than the first mentioned ones, such as placing in turn the tip of each finger on thumb nail of the same hand; 3, complicated coördinated movements, as writing, drawing.

These three kinds of movements must be practiced every day. The various exercises performed by Frenkel's patients are described by Hirschberg, who supervised their execution under Frenkel's instruction, at the Salpêtrière.

Before detailing them it may be well to sound a note of warning. These exercises are expected to be performed with the greatest exactness and with a constant expenditure of will power, and are thus extremely fatiguing. Consequently the patient must be restrained from over-doing even if he feels no consciousness of fatigue (I will touch on this later). Patient must rest a few minutes, if not longer, between all exercises. The simplest exercises are first tried, the more difficult ones later on. It stands to reason that exercises are chosen to meet the individual needs of each patient. There are two classes of exercises, those performed in and those performed out of bed.

In bed, the patient is called upon to flex, extend, abduct and adduct each leg separately and then both simultaneously. The knees and hips are likewise exercised. The patient is asked to place the heel of one foot on the big toe of the other foot. Place heel upon knee of the other leg and then slowly travel from the ridge of the tibia toward the ankle. Exercises are made alternately, first with one leg, then with the other one, with open and with closed eyes. These exercises are attempted over and over again, every morning a half hour, with frequent rests between times. Patient is encouraged to persevere until he succeeds.

The exercises in the turning hall are repeated twice a day, a half hour in the morning and again a half hour in the afternoon.

1. Patient is placed with his back to a chair, heels together, then seats himself slowly in the chair and is then made to rise in the same careful manner. No cane is used. If patient can not stand an attendant is placed at either side of him to support him if necessary.

2. One leg is placed at an ordinary walking step in front of the other, and then placed with great exactness back into its original position. Same exercise is then performed with other leg. The patient, if necessary, supports himself with a cane or otherwise.

3. Walks three paces slowly and with precision.

4. Rest in standing position, one foot before the other; with hands placed akimbo he flexes his knees and slowly raises himself again.

5. Patient, as in exercise number 2, advances one foot, then returns it to its original position, and then puts it one step behind the other one. This exercise is usually a very difficult one, requiring as it does a great deal of balancing power.

6. Walk twenty steps as in exercise number 3.

7. Number 2 performed without a cane.

8. Stand without a cane, with feet placed together and hands on hips.

9. Stand without a cane, feet separated; various movements with the arms, grasping objects, forcing back outstretched hand of physician, etc.

10. Maintain same position as in number 9, flexing trunk forward, backward, to the right and to the left.

11. Exercise number 9 with feet together.

12. Exercise number 10 with feet together.

13. Walk along a painted line on the floor, patient supported by a cane.

14. Same without a cane.

Exercises for the fingers and arms are also employed, based on the above mentioned principles. The author of this method of treatment has invented a number of inexpensive apparatus. I will mention one or two. Balls of different sizes are suspended by strings. The balls are set in motion and the patient is requested to grasp between finger and thumb a given one. A board containing a number of holes in which are fitted

[1] Frenkel, Münchener Med. Wochenschrift, No. 52, 1890.

violin keys or stops is placed before the patient. He is ordered to remove and replace certain specified numbered stops. He holds the hand behind the head and at the word of command slowly or rapidly executes the desired movement. The original position of the hand excludes the controlling influence of vision. An endless variety of similar exercises can be introduced to meet the requirements of every case.

I saw several tabetics practicing the parade-march step. One patient, while walking briskly the length of the hall, had chairs and other obstacles put into his path. To avoid these he had constantly to change his position as though he were walking in crowded streets. Regularity, slowness, precision, are the important features of these exercises which the physician impresses on his patient.

It is not my intention to detail cases recorded in literature in proof of the efficacy of this method. Suffice it to say that men like Leyden, Erb, Raymond and Hirschberg, and others, speak of it in terms of highest praise, and report a number of cases of practical cures of the ataxia.

Leyden[2] says: "To my mind, it is only in this or some similar manner that one will attain the best results possible in the therapeutics of tabes."

I will, however, briefly recount a few general impressions I received while almost daily observing the patients at their exercises. Most of the afflicted individuals were chronic cases, some having made the round of many of the noted neurologists in Europe. All were from the so-called better class of society, professors, judges, militaay officers, officials and business men. Probably the most striking effect after a few weeks treatment was the revival of the patient's hopes. Men who had been confined to roller chairs for years, who had needed the aid of attendants to dress and to retire, developed a surprising amount of energy and spirit when they realized that they could again perform simple movements without aid and coördinately. This state of mind aided materially in furthering their progress.

A number of the better informed patients realized that the treatment was only intended to cure the ataxia, but it was just this feature of the disease which had prevented them from following their vocation and from finding enjoyment in life; and the visible improvement gave them new hope, at least for some relief, if not the entire cure of the ataxia. The moral influence was great. The confidence of the patients was restored. Instead of continually seeking the aid of an attendant or a cane they began attempting things themselves.

On my walks from the hotel to the turning hall I was often accompanied by a strong looking, young Serbian. Repeatedly I had found him seated before the hotel waiting me. He was a tabetic patient, but walked quite well with his cane. One day we met Dr. Frenkel when entering the turning hall; he chided the Serbian for waiting for me, explaining to me that the patient had once fallen, and ever since had been afraid to walk alone. The presence of an infant at his side restored his confidence. A few weeks later the patient's confidence in himself was so much restored, that I often met him taking long walks only supported by his cane.

The time required before any improvement is visible, varies greatly, depending naturally, firstly, upon his condition and secondly, upon the temperament of the patient. I have in mind a patient 45 years old, who when I arrived at Heiden spent most of his days in a roller chair and could with difficulty, supported by a cane, drag his legs one hundred paces. After four weeks he walked the length of the long turning hall unsupported by his cane. Another patient who had been lifted bodily out of his roller chair and carried up the steps into the hall, and had there been supported through the exercises. by means of a broad belt which had been fastened about his body and to which handles had been attached, so that the attendants might hold him up, walked up the steps of the turning hall, six weeks later, supported only by his cane. Another case was an old and feeble man who after three months practice in Paris performed all the feats in a most perfect manner. He walked along a painted band on the floor, four or five inches broad, backward and forward and never overstepped the borders. He stood perfectly rigid on either foot, the other one flexed, without losing his balance. He fenced with an opponent, readily assuming the various attitudes. He danced a polka at a ball given at the Freihof hotel. For a more detailed account of other cases I refer you to the literature.

The patients after having mastered the details of the exercises are supposed to continue them conscientiously in their own homes.

Frankel placed at my disposal a manuscript of a paper soon to be published in the *Berliner Medicinische Wochenschrift*. In this, he accounts for the purported failures of his method of treatment, by attributing so-called failures to two causes:

The faulty selection of exercises for individual patients. As stated in the beginning, it is a matter of greatest importance to begin with with simplest exercises and then adopt them to meet the individual needs of each case. The second cause of failure is attributed to patient's loss of sense of fatigue. Owing to the destruction or interruption of the centripetal nerve path, the patient, having lost his muscle sense, is no longer conscious of fatigue. Consequently if not forced to rest, he will do too much and greatly injure himself. *Over-taxation must never take place*, in every instance must be carefully avoided and guarded against. After exercising patient ought to rest for an hour or two, ought never immediately attempt long walks.

When a relaxed condition of the muscles and tendons exist, massage and other gentle stimulation is resorted to.

Frenkel has recently called attention to an heretofore unmentioned symptoms of tabes hypotonus. This is manifested by patient's ability to make more than normal exercising with his limbs.

A normal individual lying flat on his back, can but lift his legs so that it is at right angle with the trunk. A tabetic patient of high degree, brings the leg nearer the trunk. I saw a photograph of an exaggerated case of hypotonus; the patient was an inmate of the Salpêtrière and could place his straightened leg on his trunk, so as to make it touch the shoulder. Hypotonus is due to the relaxed conditions of the tendons of the joints.

There are but very few contraindications to treatment and exist only in cases where the atrophy of the muscles, disease or deformities of the joints render the use of limbs impossible.

Frenkel objects to gymnastics and turning for

[2] Leyden: Ueber die Behandlung der Tabes Dorsalis. Berl. Klin. Wochenschrift, No. 17, 1892.

tabetic patients and in evidence of the dangers attending each exercise, quotes a number of cases of fractures resulting therefrom.

In conclusion I need hardly state that the above is merely a sketch of the new method of treatment of ataxia due to tabes. For the benefit of those who desire fuller information, I affix a complete list of articles bearing on the subject, which have appeared up to date.

Berlin, November 1896.

LITERATURE.

Frenkel: Die Therapie atactischer Bewegunstörungen, München. med. Wochenschrift, No. 2, 1890.
Leyden: Behandlung der Tabes dorsalis; Brl. Klin. Wochenschr. No. 17, 1892.
Hirschberg: Traitement mécanique de l'ataxie locomotrice. Extrait du Bulletin général de Thérapeutique, Jan. 30, 1893.
Hirschberg: Die Bedeutung der Frenkelschen Methode bei der Behandlung von Tabes dorsalis. Neurol. Centralblatt, No. 18, 1894.
Frenkel: Die Behandlung der Ataxie der oberen Extremitäten. Zeitschrift fur Klin. Medicin, Bd. xxviii. 1895. Heft. 1-2.
Belugon: Traitement mécanique de l'ataxie. Extrait des archives générales de médecine. Février 1896.
Frenkel: De l'exercise cérébral appliqué au traitement de certaines troubles motrices; Semaine médicale, No. 16, 1896.
Frenkel: Erfolge der Uebungtherapie bei Tabes Verhandlungen des Vereins f. innere Medicin in Berlin, May 5, 1896.
Erb: Die Therapie der Tabes. Volkmann Klin. Vorträge, No. 150. April, 1896.
Reynaud: Le rééducation des muscles chez l'ataxie locomotrice (Methode de Frenkel) Revue internationale de thérapeutique, Mai, Juin, 1896.

## ETIOLOGY, PATHOLOGY AND DIAGNOSIS OF APPENDICITIS.

BY C. E. RUTH, M.D.

PROFESSOR OF DESCRIPTIVE AND SURGICAL ANATOMY, KEOKUK MEDICAL COLLEGE; PROFESSOR OF CLINICAL SURGERY IN ST. JOSEPH'S HOSPITAL, KEOKUK, IOWA.

If we would correctly estimate the tendencies of appendicitis it will be through an understanding of its etiology, pathology and diagnosis. As the varying anatomy and relations of the appendix have much to do with the origin, course and recognition of appendictis they should receive some consideration. The appendix is an organ absolutely without function. For this reason nature is attempting to rid herself permanently of its presence. At the present rate it will be many generations before it is accomplished, and until then physicians must continue its study. All organs without functional activity have less resistance to abnormal processes than those which are functionally active.

Every conceivable position is occupied by the appendix, but usually its base is in the right iliac fossa. Its tip may be anywhere that its length, from one to six inches, may enable it to reach. In the female its proximal opening into the cecum is said to be somewhat larger than in the male. Thus, other things being equal, the woman has a little better chance of recovering than the man with appendicitis. We usually find the appendix is as strictly an intraperitoneal organ as any part of the small intestine, or we may find that the serous coat of the cecum stretches over its proximal third or half, while the balance is intraperitoneal. The serous investment of the cecum may be continuous with the iliac fossa, directly across and in front of the appendix, and in that way comes only in contact with the anterior surface of the appendix and the latter really has only two investing coats, mucous and muscular, and is consequently extraperitoneal. Its drainage is often against gravity and around sharp angles, obstructed by pressure and position with a muscular wall usually less developed than any other part of the intestinal tube. The longitudinal bands on the ascending colon are directly continuous over the cecum to the appendix and are therefore the most important guides to finding the appendix. Lack of this simple anatomic point may compel a long search for this little organ, which should be instantly followed to its cecal attachments, where inflammatory processes have not destroyed this landmark. The cecal attachment of the appendix is usually on a line between the anterior superior iliac spine and the umbilicus, and about two and one-half inches from the spine. The appendix has a mesentery of its own of varying extent.

When its mesentery extends entirely to the appendix tip the nourishment for the organ is the best possible. Frequently the mesentery extends but a short way and the distal portion receives only such blood supply as can be carried by the coats to the distal end. Thus should sudden swelling occur from any cause the tense peritoneal investment at once strangulates the distal end and favors perforation and the passage of pathogenic bacteria, if not immediate gangrene of the entire distal portion beyond the mesentery.

The caliber of the tube is normally so small that no great amount of swelling of mucosa is required to produce complete occlusion. The peritoneal investment is tense but will permit of great distention if the pressure from within comes on very slowly, but if rapid it yields by rents occurring at one or various points. Stercoral calculi are the principal foreign bodies now recognized as etiologic factors in the production of appendicitis. To these add the anatomic disadvantages under which is placed the extension by direct continuity of all forms of inflammation from the colon, mechanical pressure from fecal accumulations in the ascending colon, and in the female extension of inflammatory processes from uterine adnexa; we have nearly the sum total of appendicitis etiology.

Pathologic varieties. Its pathology is: 1. That of the ordinary cecal and colonic troubles by continuity of tissue due to digestive disturbances of all kinds. These are usually primarily of the milder or catarrhal variety. 2. Ulcerative, in which one or more or all of the coats may be lost at one or many places. 3. Obliterans, which is simply a variety of the ulcerative. 4. Gangrenous.

The catarrhal may occur without leaving behind it any appreciable lesion or may lead to either of the other forms.

Where ulceration or gangrene does not occur there would seem to be in every case a lowered vital resistance with great liability to recurrence of other attacks. So marked is this tendency to recurrence, even in the mildest cases, that hardly any physician considers a case of catarrhal appendicitis is cured unless three or four years have passed without attack.

This lowered resistance in the appendix would appear in these cases to be analogous to that found in the catarrhal inflammations found in pharyngeal mucosa rather than to gross anatomic lesions.

The ulcerative form may follow in the wake of the catarrhal by pressure depriving the mucosa in various ways of its blood supply or by direct action of an irritant. This process may remain limited to the mucosa and in its repair cause the third variety, obliterans, by adhesions of the walls of the tube. Should this begin at the distal end, repeated attacks, if perforation or migration of septic material does not occur, will effect a cure by obliteration. Should it occur at the proximal end the same result is still possible but not likely, for the septic material caught beyond the point of occlusion can by no plan, except abscess for-

mation, be evacuated unless the neighboring lymphatics be for a long time loaded with septic materials constantly liable to destroy life by abscess rupture. When the case progresses in this manner to complete obliteration by either plan, a recognized rare occurrence, the cure is complete and permanent.

When the ulcerative process is slow, whether the appendix be *intra-* or *extra*-peritoneal the general peritoneal cavity is protected as a rule for a considerable time by inflammatory exudate, but when rapid the general peritoneal cavity may be involved in twelve to forty-eight hours. Slow progress of the inflammatory process favors the development of tolerance by the peritoneum in the neighborhood of the trouble.

Gangrene, whether involving a considerable portion of the appendix or but a very small area, is usually due to sudden deprivation of its blood supply, because of its absent or limited mesentery or to pressure necrosis, either of which may permit the passage of the most virulent infection to the peritoneal cavity in a few hours before sufficient time has elapsed for inflammatory exudate to throw out a protecting barrier of any kind. Rapid swelling of the appendix may so weaken all the coats that a serous exudate between and within them favors the culture and passage of pathogenic bacteria and septic material which may produce general and usually fatal peritonitis without solution of continuity in any coat of the organ. The recognition of the colon bacillus in many internal organs without any appreciable lesions has compelled caution in attaching so much importance to it in lesions about the appendix, as has been given it in the past. We should justly consider it of secondary importance in inflammatory trouble about the appendix and its presence due more to accident than as a causative factor (Welch). They are prone to collect in parts already invaded by other organisms, or weakened by injury. If the appendix be intraperitoneal it is, other things being equal, more liable when inflamed to produce an abscess that will be followed by general or local peritonitis. It is also in its earlier stages easier of surgical access.

When the cecum and appendix receive an extension of the peritoneum from the colon to the iliac fossa on their anterior surface, abscesses forming about the appendix are almost sure to be extra-peritoneal and may spread great distances, dissecting up the peritoneum, going down into the pelvis, up behind the colon and well across toward the median line, and still show but little tendency to rupture. Appendix abscesses so placed cause no inflammatory, agglutinating exudate to be thrown out into the peritoneal cavity and the intestines are consequently free from adhesions. The intestines are carried up in front of the tumor and may give at all points tympanitic resonance. At the base of the appendix where the mesentery diverges to encircle the organ there are in all cases properly but two coats, and a very large number of abscesses which form about the appendix have their apparent connection with the appendix only at this point, and are for that reason usually approachable extra-peritoneally.

This is probably one of the reasons why it was so long before the influence of the appendix was discovered in the production of the purulent accumulations in and about the cecum. The perforation of the two inner coats may occur at any point and yet the inflammatory perforation products be carried under the serous coat the entire length of the appendix in the loose connective tissue space between the diverging layers of its mesentery to the much greater loose connective tissue space about the appendix and cecum, where the pus may burrow almost without resistance till large accumulations take place as in the extra-peritoneal variety above mentioned.

Diagnosis.—If the pathology of appendicitis here given may seem obscure and confusing, it will be vastly more so when the diagnostician undertakes to clinically recognize these varieties. In fact we may say at the outset that the diagnosis of appendicitis is usually fairly accurate, but the diagnostic differentiation of its pathology is not yet possible. Pain is always present at the beginning of appendicitis, but is often remote from the location of the appendix. Frequently the pain is severe about the umbilicus, but the local tenderness will correspond to the position of the appendix and is usually midway between the anterior superior spine and the umbilicus. The muscular tissue of the abdominal wall early gives evidence, in increased resistance to manipulation, of the presence of trouble in the right iliac fossa. The pain may soon fix itself in the right iliac fossa. Nausea and vomiting are almost always present as an early symptom, but may permanently disappear within twenty-four hours without other amelioration in the patient's condition. Neither the presence of constipation or diarrhea aids us in the diagnosis of appendicitis, unless the latter be sufficient to empty the alimentary canal and aid in the palpation of the abdominal contents. Tenderness in the right iliac fossa may be said to be always present. Palpation of the appendix without considerable enlargement of the organ or abscess formation is rarely possible. It should, however, always be attempted, and by placing the fingers of the right hand upon the abdomen and making steady, firm pressure downward just to the outer side of the umbilicus, draw the hand downward and to the right toward the iliac spine, and as the spinal column, external iliac artery, psoas muscle, appendix, etc., are successively crossed a lateral motion of the hand parallel with the long axis of the body should be made, so as to detect any abnormal condition of each tissue or organ before it is allowed to escape from under the fingers.

A distinct tumor is rare before the third day. Dullness is not found if the appendix is behind the cecum (Shrady). Fluctuation does not occur until suppuration is far advanced. Examination of a large appendicular abscess must be made with caution to avoid rupture, especially in the case of a large tumor with evidence of pronounced sepsis, when the tension is so pronounced as to overcome or to have greatly retarded its blood supply and the temperature has fallen to or near normal. The patient feels almost well, the physician is led to doubt his diagnosis and to advise the patient and his friends to delay radical measures. This is the calm that so often precedes the fatal storm. When the blood pressure was so great or the abscess tension was so great as to limit absorption of septic material into the system, the blood supply was also reduced and the vitality of the abscess wall so low as to prevent further exudation to strengthen weak points (Harris), and palpation must be very gentle or entirely interdicted because this choking of the blood supply from the abscess pressure having stopped the formation of plastic exudate for the protection of the general peritoneal cavity, rupture is

imminent. Careful attention to the history and examination should enable one to readily differentiate appendicitis from psoas abscess, morbus coxarius, renal and biliary colic, tubal and ovarian disease, intussusception, carcinoma of the colon and cecum, typhoid fever and floating kidney. Peri-nephritic abscess occurring on the right side might readily deceive one as to its origin. The mistake, however, would be of no moment, for the indications in each would be practically the same. When pain is produced in the right iliac fossa by pressure on the left side of the abdomen we should be suspicious of appendicitis.

To sum up the diagnostic symptoms upon which we must rely to recognize appendicitis I mention: 1, pain; 2, nausea and vomiting; 3, tenderness and muscular resistance in the right iliac fossa; 4, palpation, tumefaction, fluctuation; 5, septic manifestations.

---

## OF WHAT USE IS SURGICAL TREATMENT IN OVARIAN NEUROSES?

Read before the Nebraska State Medical Society, at Lincoln, Neb. May 19, 1896.

BY A. F. JONAS, M.D.

PROFESSOR OF CLINICAL SURGERY IN THE OMAHA MEDICAL COLLEGE; SURGEON TO OMAHA DEACONESS HOSPITAL, ETC.

OMAHA, NEB.

The term *neurosis*, as commonly used by the profession, has an indefinite meaning. It may mean a pain, severe or slight, of a "neuralgic character." It is often applied to irregular functional disturbances, as for example, the gastro-intestinal functions, which may be perfect to-day, less so to-morrow, violently disturbed the next day, and normal the fourth, without any assignable cause. Neurosis may mean emotional manifestations, for example, irritability of temper, explosions of unprovoked grief, attacks of epileptiform convulsions, such psychic disturbances as melancholia and maniacal conditions. Ecstasy, delirium, hallucinations and trance have been called by that convenient term. It is often applied to that indefinite symptom-complex, known as neurasthenia, or more popularly called hysteria. In short, no matter what the train of symptoms may have been, when it seemed impossible to find structural changes due to inflammatory processes, acute or chronic, or when it could not be shown that there existed an atypical cell proliferation in the form of a neoplasm, or other new formation, it has been the custom to speak of it as neurosis, or a neurotic condition. When there has been observed pain, aberration of glandular or organic function; psychic or mental disturbances, convulsive manifestations, without discernible organic structural changes, that much abused term, *neurosis*, has been found of great convenience.

Under the modern system of specialism, when each organ has its special custodian, whose sole duty seems to be to stand as a guardian angel over that which he has selected and adopted, it seems clear to each specialist that this long train of neurotic symptoms, are nothing more nor less than reflexes (another term used with so much delight, and no more understood than the other), beginning in that particular organ which happens to be the pet of a given specialist. There is such a strong tendency for every specialist to attempt to look into the human body, through his own little speculum.

The ophthalmologist, if he can find nothing visible by external inspection or ophthalmoscopic examination, discovers slight errors of refraction or accommodation, and in that, a reflex neurosis which explains that headache, the disinclination for work or pleasure.

The otologist is sure to find the origin for vertigo and fretfulness in the ear.

The rhinologist is positive that the dyspnea and its accompanying train of symptoms, originate in the deflected septum, spurs, thickened turbinated tissue and post-nasal adenoids.

The lung and heart specialist is inclined to ignore what the aforesaid authorities have diagnosticated, for he hears through his stethoscope sounds that explain all.

The gastro-intestinal authority finds matters very plain. He removes the stomach contents after giving a test meal, and with reagents and microscope, and possibly, if he be well advanced and properly equipped, he may employ the gastroscope, and the gyromele. He indicates to you as plainly as the writing on the wall, what is at the bottom of the trouble.

The orificial specialist is positive, beyond all powers of argument, that all neuroses, and even appendicites, begin in the external orifices.

The gynecologists, and nearly one-half of the physicians of our cities are professed gynecologists, never fail to trace an ache, or pain to the pelvic organs. The uterus and its adnexa are centers, which, to their minds, control every function in a woman's body. Every ache and pain is a neurosis, and when located in a region remote from the pelvis, is a reflex condition. Under the head of neurosis, according to our enterprising and pushing gynecologist, is included a wide range of disorders, and I fear, a multitude of sins.

When we view this vast subject from the standpoint of the true gynecologist (not the six weeks' policlinic fledgeling, but I mean the earnest, honest, broad minded, careful, painstaking, scientific gynecologist, whose specialty is the culmination of a wide experience as a general practitioner, and whose skill as a specialist is the outcome of a long and large experience at the bedside), we soon find that we must eliminate the larger portion of nervous manifestations, from our consideration, as diseases originating strictly from the organs of generation which are frequently denominated as ovarian neuroses.

Under the caption of ovarian neuroses, we may include all such affections as are characterized by primary pain or other disturbances, referable to the ovarian regions, unattended by inflammation or any ascertainable structural lesion.

If we adhere strictly to this definition, we will find that the vast majority of the gynecologic cases that come to us, are of a neurotic character. The pelvic distress and hypersthesia, local or diffused, is in a large portion of cases, unaccompanied by structural change. Nearly all these cases complain of distress involving, one, and in some cases, nearly every vital organ in their bodies.

For convenience of description, in our discussion we may adopt the classification of Baldy: 1, neurasthenia; 2, hystero-epilepsy; 3, psychoses-insanity.

The more modern, more esthetic, and possibly more scientific appellation, neurasthenia, has largely displaced the term hysteria. The latter has become to be regarded as a reflection upon the mental balance of the sufferer, and is often means a forfeiture of sympathy on the part of her friends. But to designate the long and variable train of nervous and mental

disorders, as neurasthenia makes her an object of solicitude and the tenderest care from the side of her friends, and stamps the doctor, in the estimation of all concerned, as a skillful diagnostician and a profound physician. While hysteria and neurasthenia are described under separate heads, still when we study their symptomatology we find that both have much in common. We find in hysteria (Webber) "an almost innumerable variety of symptoms, which may be analyzed in a general way into signs of increase, diminution, or perversion of various nervous functions. It is commonly classed as a functional nervous disease, and has no recognizable patholic anatomy. Postmortem investigation gives no clew to the morbid process."

For neurasthenia (James J. Putnam) we find "certain states of the nervous system of which the anatomic basis is unknown, but which is characterized on the one hand by lack of vigor, efficiency and endurance, affecting usually a large number of nervous functions, and on the other hand, by signs of active derangement, which in part seem to occur as positive symptoms, and in part are due to failure of the mutual control which the different parts of the nervous system afford each other in health."

When we make a critical analysis of the cases that come to us for treatment, we find that nearly two-thirds of them belong under the above headings. Their subjective symptoms are innumerable, their objective signs, aside from feebleness and palor due usually to too close confinement and inactivity, are few. Among the endless subjective symptoms, a few usually predominate and are referred to some special organ, and in these progressive days, when pelvic organs have met with such terrible onslaught and have been so persistently directed to the pelvis, the poor sufferer being a woman, naturally thinks of those organs which make her such. She seeks comfort and advice from the specialist, and he being ambitious and anxious to distinguish himself, and being imbued with the idea that the culmination of all skill is in blood, seldom fails to find something in the pelvis, that, to his mind, solves the entire condition and offers him opportunity for sanguinary achievements. If he does not find a laceration of cervix uteri or perineum which need repair, it is a metritis, that must undergo the ordeal of curettement, and if not that, a thickening in one or both broad ligaments, which means chronic salpingo-ovaritis, and if he be an up-to-date specialist, he can invariably diagnose adhesions; or he finds adherent flexions and versions. The diagnosis having been completed a grave prognosis made, an operation is urged as the only means of cure, and often the only possible means of saving life, for blood he craves, and nothing short of blood will appease his craving. The frightened patient gives her consent. Elaborate preparations are made; a half dozen or more colleagues are invited to witness the marvelous feat. The operator clad in spotless gown, in his sterilized hand he holds aloft a gleaming, keen-edged knife. He calls *time;* with a sweep or two of the knife the peritoneal cavity is open; two fingers are rapidly thrust into the sacred recesses of the pelvic cavity; an unoffending ovary and tube, a marvel of perfect anatomic form, is drawn forth and instantly pronounced cystic; it is tied off by a specially devised method, cut away and the pedicle dropped. The same procedure is followed on the other side. To vary the condition and to give proof of his wonderful knowledge of morbid structure, he unhesitatingly pronounces the second ovary (which really does not differ from the first) to be scirrhotic. Abdominal wound closed by a new method, dressing applied and the time-keeper announces the startling information, "*seven minutes!*" A triumph of modern surgery and individual dexterity! Patient is put to bed, recovery uneventful, discharged, *cured* on the fourteenth day. Cured, did you say? By that you mean that her neurasthenic manifestations have vanished. Did you ever see one of these chronic sufferers cured in fourteen days? When Lawson Tait only a few years ago published his remarkable tables, of a hundred or more cases in a table, and we found that 98 out of 100 cases were discharged cured, you and I, in our verdant simplicity imagined that when he said *cured*, it meant to be relieved from all pain and distress, and the departed bloom of youth had returned. And when we found that our cases had not been cured in six months or a year, and some were even worse, it slowly dawned upon us, that "cured" in published statistics, meant a survival of the surgical ordeal only. When we examined the appendages removed by the aforesaid seven minutes operation, we found that what we had been taught to be normal, unruptured Graafian follicles had suddenly, according to the aforesaid operator, become cysts. The old sites of the ruptured follicles had become evidences of a "fibrous condition," which was proof positive of scirrhosis. The Fallopian tubes were open at both ends and otherwise so perfect as to delight the teacher of anatomy who is in search of normal specimens to demonstrate to his class. One well-known surgeon, after he had removed the uterine appendages, found that what the text-books describe as sites of newly ruptured Graafian follicles, an ulceration of the ovaries. Who has not seen several pairs of such ovaries with open Fallopian tubes, with beautifully branching fimbriæ, exhibited before medical societies, as the result of a half-day's labor. You and I have no hesitancy in pronouncing them to be normal, and we ask why were they taken out? The answer can always be anticipated. "Why, she had ovarian neuralgia;" the "cystic" and "scirrhotic" condition caused reflex neuroses!

We have often wondered why operators in comparatively small towns have such a large proportion of pus tubes among their abdominal cases. Recently we had some light thrown on this point by an operator, who, in a country district where specific infection is a rarity, removed in ten minutes uterine appendages identically like those described in the foregoing seven-minute operation. The operator carefully squeezed the Fallopian tube from its fimbriated toward its uterine end, and succeeded in pressing out of it a very few drops of fluid that had a very slight opaque appearance; instantly the diagnosis of pyosalpinx was made. The microscope was superfluous with a surgeon who possessed such microscopic vision.

If we could examine all the specimens removed from cases in the many reported "series" where the mortality is small we would find a large proportion to be those of absolutely normal uterine appendages. Have you taken pains to follow the subsequent history of these cases? You will find that a large proportion, the majority of them, are not benefited. Many have been made worse. Why? If these cases had been carefully investigated, the conclusion would have been forced upon the operator that the local pain was only a *local expression of a general nervous condition.* In these cases we sometimes have persistent pain in the

stomach, liver, heart, lungs, head, arms and legs. Why not extirpate or amputate one or more of these occasionally. But the resourceful gynecologist promptly decides that the pain in these various organs are of a reflex nature, which take their origin in the womb or ovaries. Poor maligned organs, "more sinned against than sinning!"

A few years ago I had occasion to do a successful Morton's operation in a case of metatarsalgia in the left foot of a young married woman. The uterus had been faithfully painted with silver nitrate solution twice a week for several months by a "gynecologist," under the supposition that the pain in the foot and calf of the leg was a uterine reflex.

About a year or more ago I was visited by an unmarried lady, who had suffered for several years from general nervous debility, probably due to over mental strain and deficient physical activity. She had some pelvic pain, somewhat exaggerated during the menstrual period; she had undergone much local treatment of the form termed "uterine tinkering" by Lawson Tait. She was referred to me for operation because drugs, which had been given chiefly in the form of high potencies, $1 \times 500{,}000$, had not cured her. On bimanual examination the pelvic organs, which could be unusually well palpated, were found to be absolutely normal. Her chief complaint was gastro-intestinal disorders, obstinate habitual constipation. These had been regarded as due to reflexes. She was advised to return, with a written opinion, to her physician (who had given her no treatment but had referred her to me). She failed to follow my advice; she sought another operator, who promptly removed her ovaries and tubes, collected a large fee and discharged her *cured*. A few weeks ago she appeared in my office again. A nervous, fretful, emotional, broken down woman. No, hardly a woman, for that which distinguished her sex had been taken from her, without any compensation for her loss. If her tubes and ovaries had undergone structural changes, as the result of disease, she was unsexed already, and to have removed them would have given her health, but to remove her normal uterine adnexa the surgeon is directly responsible for the aggravated neurosis. As she sat in the chair bemoaning her fate and denouncing her surgeon, she cried: "If I had only followed your advice! What shall I do? What shall I do?" I have seen many such cases, and I am sure other doctors have seen similar cases that have been operated on. My personal experience in abdominal work began when pelvic surgery, aside from the removal of large ovarian cysts, was in its infancy. Shortly after the field had been opened by Beatty, Tait and Hegar, for the removal of diseased uterine adnexa. We all of us looked to these men for guidance. While their lists of cases were long ones, the information they conveyed was imperfect and meagre and referred only to the immediate results of the operation. Little or nothing could be learned regarding the ultimate outcome. We were compelled to learn much by our own experience, we had no precedents established as we have today. In my anxiety to relieve suffering I frequently operated on cases belonging to the class under discussion, but the ultimate outcome was usually so unsatisfactory that with accumulating experience with each succeeding year I refused to operate on cases that I would have advised surgical procedure in the preceding.

I unhestatingly declare that all cases in which no structural changes in the pelvic organs can be made out, should not be subjected to operation, and in cases where under mistaken diagnosis the abdomen is opened and the appendages found to be normal they should not be removed, no matter what the local subjective symptoms. The experience of such men as Gill Wylie, Boldt, Howard Kelley, Charles Noble, Baldy and many others, has shown that no benefit can be expected, but the cases are often made worse.

*Trachelorraphy.*—An operation which in popularity stands next before salpingo-ovarectomy is trachelorraphy. A minor operation which every tyro can do, and illustrates the ready credulty of the average patient. It brings the operator as large a fee as the average abdominal section, and has established the reputation of many a man as a "fine surgeon," who would shrink from an ordinary amputation.

Every laceration, however slight, must be repaired, upon the assertion that nerve endings are adherent to the cicatrix, which if they have not already produced, soon will cause a neurosis and innumerable reflexes. This operation, when done according to the indications laid down by Emmet, is useful, but as usually done is useless in four-fifths of the cases, as proven by the results.

*Hystero-epilepsy.*—According to Charcot and his pupils, hystero-epilepsy "is distinctly a symptom of hysteria, and in no way confounded with epilepsy, when it assumes its typical form." . . . "The seizure is usually preceded by a change in disposition, perhaps for some days, and more directly by an aura, abdominal or epigastric, which affords the patient time to seek a position of safety. The attack proper is divided into four periods: 1, the epileptoid; 2, the period of contortions and great movements; 3. the period of emotional attitudes; 4, the period of delirium" (G. L. Walton). "During the intervals between the attacks the patient suffers from incomplete hysteric hemianesthesia, ovarian hyperesthesia and other hysteric symptoms . . . The aura, which is in the nature of a globus hystericus, seems to proceed from the affected ovary. The patient shrieks and falls insensible, and tonic spasms result; this is quickly followed by clonic spasms and these are succeeded by muscular relaxation, stertorous respiration and coma. The second stage (phase des grands movements) consists of movements which are rhythmical or disordered, and which are sometimes violent and ludicrous. The next stage (phase des attitudes passionelle) is marked by a rapid succession of attitudes and gestures which suggest the term phase of *lubricity*. Hallucinations of terror, sorrow, joy, etc., follow. The paroxysms may recur frequently and may be provoked by slight pressure upon the ovarian region on certain hyperesthetic spots; sudden and firm compression of the ovary will sometimes arrest a paroxysm" (Foster).

Charcot and his followers believed that this affection had its origin in the womb and its appendages. This view seemed confirmed by the observation that the attacks often became worse during the menstrual period. When abdominal section became a comparatively safe procedure, surgeons did not hesitate to drag forth and remove tubes and ovaries that were often models of anatomic perfection. Occasionally a case was benefited and sometimes cured. These were reported with all the extravagance of which the English language is capable; and many more were reported before sufficient time had elapsed to note if

the case had even been temporarily benefited. One of the blots of this progressive period in medicine is the premature report of cases.

But what became of the fifty that were not benefited and not reported, but were permitted to wend their miserable way, unpublished and uncured? Hence those of us of more limited opportunities and less experience were led into the error of holding up to our distracted patients a light of hope that burned a short while, then flickered feebly and went out. Have you ever experienced the despair that follows hope, the darkness that succeeds a dazzling light?

My own experience comprises eight cases. When we study these cases we find, in all, the attacks were aggravated during the menstrual period. In seven the attacks occurred between the periods. In one only during the period. In six the attacks could be brought on by compression of one or both ovaries. In the one case where the attacks occurred during the period only, a complete cure has been effected. In one case, that of a married lady, mother of eight children, the attacks sometimes numbered two or three during an hour. After five years, I was informed that she seldom has more than one convulsion during twenty-four hours, "but that they are very much milder." We see she is not cured. The chief benefit that has been derived is that she can not propagate any more of her kind. In the remaining six cases we imagined for a time that they were improved, but gradually relapsed into their former condition.

When we take into consideration that some of these cases recover spontaneously, we wonder whether those which are seemingly benefited by an operation might not have recovered without one. My own limited experience is not encouraging. On consultation of recent literature I find the results of those operators of large experience is no more encouraging, and I find that the weight of opinion is in favor of surgery only in such cases where the attacks are confined *entirely* to the menstrual period. In all other cases it is worse than useless to operate.

Even the insane woman has not escaped the enterprising abdominal surgeon. He studied his cases profoundly and selected carefully such in whom the mental disturbance seemed worse during the menstrual period. They were often reported improved immediately after operation, but we have been kept in the dark in reference to the ultimate outcome. My own experience has taught me that it is an exceedingly hazardous procedure to operate on man or woman who has exhibited unusual mental "peculiarities." It has been my misfortune to have had four cases of post-operative insanity. The immediate recovery in all the cases was uneventful. Convalescence had practically been completed when mental disturbance appeared. Without any evidence to the contrary, I feel that we are not justified in doing salpingo-ovarectomy on the insane women, except for organic changes, no matter how aggravated her condition during the period, if she is not perfectly sane during the inter-menstrual time. In cases where insanity occurred only during the flow we might expect recovery after inducing a premature menopause by operative interference. You ask why in the face of this evidence do men continue to mutilate women for functional disorders? We may answer:

1. Inexperience and mistaken diagnosis. No man should begin pelvic work until after many years of general practice, until he has served a long apprenticeship with an experienced diagnostician and operator, so that he may avoid the pitfalls into which those of us have fallen when there were no precedents to guide us. The opportunity for acquiring diagnostic skill in our large medical centers is almost unlimited, but it requires time and patience to acquire it. The great trouble about our post-graduate teaching is, that somehow, although the opportunities for becoming proficient in diagnosis are abundant, the student returns to his chosen field with his head full of technique and not enough of diagnostic landmarks.

2. The desire to do many abdominal sections and to show a low mortality ratio in his reports. At this time nothing is more tiring and time-robbing in our society meetings than to report a long series of abdominal sections, each case differing from every other in the list. A surgeon who aims to do many laparotomies always does many useless ones. Such a surgeon takes his own reputation solely into account, irrespective of what benefits his patients may derive. His policy is a short-sighted one. His selfishness predominates in all his work. His many needless operations will in the end cost him his reputation, for which he has so zealously and short-sightedly labored.

3. The prospects of a good fee. The man who is prompted chiefly by a fee (and we know of such) is unworthy of the confidence of his patients and his fellow practitioners. He should be relegated to that oblivion from which he came.

4. The pleadings of the patient. Who can sit unmoved when the poor suffer who has exhausted many methods of treatment without relief appeals to you as a surgeon. I have often found that it required more courage to refuse an operation than to do one. Surgeons should lay sentiment aside at such a time and look the stern facts in the face and decide accordingly.

5. The fear of losing your patient, that she may go to another surgeon. Have the courage of your convictions, state them frankly and plainly and in the end you will be the gainer; subsequent patients will place confidence in your opinion.

We have endeavored to point out what must *not* be done for these cases. And now more than ever, the great question confronts us. What can we do for these unhappy beings?

Experience has shown us that the surgery of the present is a failure. We must seek in other directions and for other means which may offer a hope of relief. We have seen that the majority of these cases with functional disturbances are inactive physically and mentally; they are anemic, have muscular atony, poor circulation, gastro-intestinal distress, especially obstinate constipation. It has been my practice for years to insist on some form of physical exercise. If the case is too feeble to do this alone begin with the aid of an assistant, who aids in the various passive and active movements, followed by massage. Later, various forms of gymnastics; then riding, walking in the open air. But the difficulty has been the patient soon ceases to be interested and she returns to her old condition. Of late I have succeeded better. I have prescribed that fascinating and popular modern innovation, the bicycle, one of the most useful machines invented in the last century. In nearly every case the patient has forgotten her medicine and her doctor, and goes wheeling merrily along, with new interest, new plans for life and happiness and better health.

In this dissertation, it has been my aim to call attention to some of the abuses in our profession. If I have been severe in some of my statements they have been prompted by motives for the improvement of surgery. I have not spared myself. I have frankly spoken of my failures in the hope that my small contributions might assist us in the future to avoid a useless method and search along new lines. As broad and progressive surgeons we must become, first of all, diagnosticians, not along special and narrow lines, but must be willing to give the time to study and learn the nature of all diseases to which the body is heir, and all possible means for their proper recognition. The gynecologist, especially, should have a most thorough knowledge of neurology, gastro-intestinal diseases and affections of the urinary tract. Unless we are thus prepared we will be blunderers, groping mostly in the dark, and our therapeutics will be solely experimental. I am confident, however, that even now we have at our command the means which can and will remove from our profession the stigma of an inexact science. Much has been done for the cure of woman's ills in the last decade. We have only begun to find means for the relief from suffering in her who is the better, nobler and kinder half of humanity. She who is man's inspiration, his joy and his hope.

## EXTRA-UTERINE PREGNANCY.

Read before the State Medical Association of Missouri, May 19, 1896.

BY T. F. PREWITT, M.D.

Professor of Principles and Practice of Surgery and Clinical Surgery, Missouri Medical College; Surgeon to St. John's Hospital and Infirmary, etc., St. Louis, Mo.

In fulfilling the functions for which the sex was created, no accident more dreadful can befall a woman than that of extra-uterine pregnancy. She may have reason to suspect that pregnancy has occurred, but in that fact she finds nothing to excite apprehension of the future. On the contrary it may kindle in her bosom the fondest aspirations of motherhood; the instincts of maternity may arouse in her heart the tenderest emotions and visions of that supreme happiness which fill the soul of the mother, when, having passed the period of probation, she clasps her firstborn to her breast with rapture. Should she already have been a mother, there is nothing different from past experiences and she has no dread of the future. Soon the inevitable catastrophe comes, it may be with the suddenness of the lightning's flash; an agony of pain, collapse and death. It may be all so sudden and violent that no chance of rescue is offered. Yet this is not always so, not even perhaps in a large proportion of cases. The clinical history and certain significant symptoms often serve to warn the practitioner, and woe to his patient if they are not quickly heeded and promptly acted upon. He is confronted with a grave responsibility and if he fails to grasp the situation or misinterprets the symptoms, a life is sacrificed.

Six cases have fallen under my care. Of these, two died and four recovered. Not the least instructive of these are the two fatal cases, both of which I believe would have recovered had I not followed the teachings of the time, which I am now convinced were erroneous.

The first case I have given somewhat in detail because the clinical history is obscure, and I believe I did not adopt the course best adapted to secure the recovery of my patient.

*Case 1.*—Mrs. G. C., aged 43 years, mother of four children, the youngest of whom is ten months old, was taken on Oct. 28, 1890, with severe pains in the pelvis, and I was sent for. I found that she had menstruated at the fifth, sixth and seventh month after her last delivery although still nursing her child, but for the last three months had missed her periods. During this time she had had no symptoms to induce her to believe herself pregnant, except the failure of the menses to appear. Upon making a digital examination I found the uterus somewhat enlarged. I could feel no swelling or enlargement outside of the uterus. I ordered quiet and anodyne enemata, which relieved her. On November 5, I was called in haste to see her, the husband stating that she was suffering greatly and was quite faint. I found her crying out in an agony of pain located in the pelvis, her pulse feeble, her skin cool and pale and in a condition of partial collapse. I could feel no swelling or tumor outside of the uterus but a soft fullness in Douglas' cul-de-sac. The pain, when the finger was brought in contact with the roof of the vagina, was excruciating. She vomited once or twice. The diagnosis was tubal pregnancy with rupture of the sac with hemorrhage into the pelvis. I proposed abdominal section, to which they readily consented. The hygienic surroundings were very bad, but with the aid of Dr. H. S. Brookes and two medical students, I proceeded to make an incision four inches in length. Upon opening the abdomen a quantity of blood gushed out, confirming at once the diagnosis. The sac was found connected with the right Fallopian tube. The mass was brought up and the pedicle tied with a double ligature. The tumor was then cut off. The pelvic cavity was then freely douched with hot water and Thiersch's fluid. The greatest difficulty was experienced in removing the clots, which came away in large quantities. When it was supposed that all had been removed further exploration revealed additional clots firmly adherent to the intestines, which had to be picked off with the fingers, doubtless leaving many others. A drainage tube was placed to the bottom of Douglas' cul-de-sac and the wound closed. The woman was placed in bed in good condition and Mr. Koch left in charge. The patient was comparatively quiet up to five o'clock next morning when he left, and having no regular nurse she was left alone. The next morning I found that she had deranged the dressings leaving the wound uncovered and the tube had been nearly forced out by her rolling and tossing about the bed; this could only be imperfectly replaced. I made an attempt to replace the tube in which I only partially succeeded. At 6 P.M. of the following day the temperature was 101 F., pulse 143. Later the septic symptoms became more pronounced and she died.

*Case 2.*—Some four or five years ago I was called in consultation, and learned from the attending physician the following history: The woman, about 30 or 40 years of age, had missed one menstrual period. The day previous to that upon which I saw her she had gone to the basement of the house and while there was seized with a sharp, cutting pain in the pelvis accompanied by faintness. After a short time she went up stairs and was again seized with severe pain and faintness compelling her to send for her physician. He found her suffering greatly, with rapid pulse and symptoms of collapse. He gave her anodynes for the relief of the pain and enjoined quiet. The next day, he sent for me. The patient had rapid pulse, great prostration, abdomen distended, but with marked dullness in the suprapubic region. I diagnosed tubal pregnancy with rupture of the sac and large extravasation of blood and suggested operation. There was some delay in operating, which was done after dark and with a poor light. On opening the abdomen the blood spurted out. I fished up the ruptured sac as rapidly as I could and tied it off. I sought to get rid of the large amount of blood in the abdomen by washing it out with hot water, using eight to ten gallons for the purpose. I gave it up in despair of getting the abdomen clean, as clots continued to be found adherent to the intestines which could only be removed by the fingers. Putting in a drainage tube, stitching up the wound and applying antiseptic dressing, the patient was put to bed, hot bottles applied and other measures taken to bring about reaction, but all to no purpose, as she failed to rally and died in the night.

I received the next day a journal in which a practitioner had had a case precisely similar. Having opened the abdomen and removed the ruptured sac, he found the patient's condition such that it was necessary to terminate the operation at once if he wished to get her off the table alive. He hastily removed with his hands as much blood as he could, closed the wound and put the patient to bed, and fortunately she rallied and recovered.

I have not forgotten the lesson and have done no *flushing* since in these cases.

*Case 3.*—Mrs. M., aged 35 years, mother of four children, had missed one period and suspected herself pregnant. About ten days after she should have been unwell she was seized with pain and faintness. When I saw her the pulse was quickened but of fair volume; the abdomen in the suprapubic region tender, more marked upon the left side. There was bloody flow per vaginam. No enlargement of the uterus could be recognized, but there was great tenderness in the pelvis, most marked upon the left side. I advised operation and performed it the next morning. Blood issued from the abdomen as soon as the peritoneum was opened. The tumor formed by the sac was pulled up out of the wound, a Tait ligature applied and the mass removed. A rent in the sac showed the source of the hemorrhage. The pelvis was sponged out and the wound closed. An uninterrupted recovery followed.

*Case 4.*—Mrs. K., aged 25 years, had never been pregnant. Had missed one period and about a week after was taken with pain in the pelvis and a vaginal flow. In spite of the measures instituted by her physician, the flow continued, accompanied by pain, for three weeks, when I was sent for. I found extreme tenderness in the pelvis, more marked upon the left side. No tumor could be felt, but a soft, baggy fullness. I diagnosed tubal pregnancy, with slight rupture of the sac, and advised operation. The next day I operated. I found a sac larger than a hen's egg with a slight rupture and about a pint of blood in the pelvis. The tumor was drawn up out of the pelvis, a Tait ligature applied, the blood sponged out and the opening closed. The patient recovered and three months ago was delivered of a healthy child at full time. Mother and child doing well.

*Case 5.*—Mrs. H., aged 30, mother of one child. On the 27th day of June, 1895, two weeks after she should have been unwell, she was taken with severe pain, some faintness, followed by the appearance of a bloody flow from the vagina. I was called and explained to her my fears of an extra-uterine pregnancy, but as the symptoms subsided in a few days I thought I might be mistaken. Mrs. H. having suffered from constipation, resorted to the use of an enema. While upon the commode she was seized with violent pain and great faintness. I was immediately notified and found her pale, with cold extremities, feeble pulse and pain. I explained to her that an immediate operation was necessary. An abdominal section was made; blood presented at the opening in the abdomen and two fingers pressed into the pelvis detected the sac connected with the right Fallopian tube. This was tied off, the blood sponged out and the abdomen closed with silkworm gut. Patient recovered.

*Case 6.*—Mrs. P., aged 30, mother of one child. Had a miscarriage about one year ago. Menstruated last, Dec. 29, 1895. Toward the latter part of January, having passed her menstrual period, she had nausea, slight enlargement of the breasts etc., and believed herself to be pregnant. About the 8th of February, 1896, she went to Indiana. While on the train she became unwell, the flow stopping and recurring without cause and accompanied with much more pain than usual. The flow continued for nearly three weeks. On February 27 she ate rather heartily. Soon after she was seized with acute pain in the region of the left ovary. This was accompanied by nausea, vomiting, feeble pulse, faintness and pallor. Dr. T. A. Martin of St. Louis was summoned, who kindly furnished me with notes of the case. "Three days after the attack, I saw her in the condition above noted, pulse very feeble and faintings occurred upon the slightest exertion. The abdomen was tympanitic and extremely tender upon pressure. Diagnosis: Tubal pregnancy, rupture of sac, internal hemorrhage and peritonitis. I did not see her again until March 29. I found her still pale, pulse 110, temperature 101.5 degrees F., abdomen tender and dark blood constantly being discharged from the vagina. I could detect a slight swelling occupying nearly the center of the abdomen, extending slightly above the pubes and seemingly attached and continuous with the fundus of the womb." I saw the case with Dr. Martin on the first of April. A distinct tumor could be felt a little to the right of median line and in front of uterus. At short intervals severe pains would come in left pelvic region and extend down left leg.

The next day, assisted by Drs. Martin, Geitz, Schlueter and Henke, I opened the abdomen in the median line. Extensive adhesions from recent inflammation were found. The sac was found in front of the uterus, the latter crowded back into the pelvis. Some adhesions of the omentum to the tumor required tying off and some effort was necessary to detach the sac from the surrounding parts and to drag it up and tie it off with the Tait knot. Considerable blood was found in the pelvis and the rent in the sac from which it had escaped was plainly visible. The fetus was found escaping from the hemorrhagic mass which filled and protruded from the rent in the sac. Some of the blood clots in the pelvis had undergone changes so that they scarcely looked like blood. The pelvis was sponged out with iodoform gauze and closed with silkworm gut. Recovery took place without any untoward symptom.

It will be seen from a study of the cases I have reported that the clinical history presents a striking similarity. Given a woman who has menstruated pretty regularly, who has had some endometritis (mucous), who has passed the menstrual period a week or ten days, who may or may not have experienced some of the usual symptoms of pregnancy, such as morning sickness, enlargement of breasts, etc. Let such a case be taken with a sharp, cutting pain in the pelvis, accompanied by great faintness and followed by a menstrual flow and possibly by recurring pains of threatened miscarriage and associated with such tenderness upon digital examination as to suggest a pelvic peritonitis, and we have the strongest grounds for making a diagnosis of extra-uterine pregnancy, with rupture of the sac. Should we hesitate to act upon these symptoms and conclude to await further developments, we shall find within a few days a repetition, more pronounced, of these symptoms—violent pain in the pelvis, faintness and collapse, weak pulse, great restlessness, extremities cold, sighing respiration—in short, the symptoms of hemorrhage added to shock caused by the rupture of the sac.

Unfortunately the practitioner may be confronted at the very outset with these alarming symptoms and may find his patient almost *in extremis* when called in to see her, no pulse or one scarcely perceptible, cold, clammy skin and profound collapse.

The practitioner is justified when called to a case of a woman who has experienced a violent pain in the pelvis, with great faintness, bordering upon collapse, and who, he finds, has missed one period for a week or more, who finds extreme tenderness in the pelvis upon palpation, who also finds in connection with these symptoms those simulating a possible threatened miscarriage, he is justified in making a diagnosis of extra-uterine pregnancy, and it is his duty to perform celiotomy and rescue his patient ere it is too late from the imminent danger with which she is threatened. He must not allow himself to be misled by the symptoms simulating miscarriage. Miscarriage in a healthy woman who has never miscarried before, can often be traced to some cause. Nor does it come on suddenly with such violent pain and threatened collapse.

Then too, the principles of modern surgery are applicable here as well. It has crystallized almost into an axiom in abdominal surgery that sudden, violent pain in the belly, emphasized in its significance by marked general disturbance, is warrant for, if it does not demand, an exploration. As Tait says, "Absolute accuracy of diagnosis in the abdomen is very far from being possible; only the ignorant assert that it is and only fools wait for it."

Even if there be a lingering doubt in his mind as to the accuracy of his diagnosis by reason of some missing link, it is still his duty to explore the pelvis and find out the trouble, since it is certain that some serious accident has happened, the consequence of which can be rectified by immediate operation.

An exploratory operation *per se*, under proper antiseptic precautions, adds nothing to the danger of the situation, while the threatened danger of his patient is too great to permit of hesitation.

In those cases where the symptoms which confront the practitioner are those of profound collapse, it becomes a question as to what course to pursue. Shall he operate at once at the risk of extinguishing the feeble spark of life, or shall he wait and endeavor to secure reaction, partial at least, before doing so? In my opinion, the latter course is the wiser. He should remember, however, that the shock is primarily due to the rupture and that the collapse is prolonged and deepened secondarily by the internal hemorrhage. As soon as there is some return of the pulse he should open the abdomen, seek for the sac, ligate close to the uterus and remove it, thereby stopping all further hemorrhage.

It was formerly advised to wash out the blood, insert a tube and drain. I believe this bad practice. In the first case I report, had I been content with simply sponging out the pelvis, accurately closing the wound, the uncovering of the wound would not have been followed by infection, and the patient would probably have recovered.

The practitioner should then sponge the abdomen as rapidly as possible with aseptic gauze, and having removed all that he can readily get rid of without prolonging the process, should close the abdomen without drainage.

The blood left is not septic and will be absorbed, and all the more readily, too, if the peritoneum be not disturbed by the flushing. If the patient has lost a great deal of blood and the abdomen is full of it, as in the second case I have reported, no amount of flushing will remove it all, and precious time is lost in the attempt. All that can be readily removed by the hands and by sponging, should be quickly cleared out, the wound closed and the patient put to bed. Hot bottles and strychnin, digitalis and whisky, should be resorted to hypodermically as may be necessary to sustain the heart's action and favor reaction.

It has been my fortune to meet with one case of abdominal pregnancy where the fetus had reached full term before its death. The case was brought to me in 1885 with what was supposed to be an ovarian tumor. I found a tumor which extended transversely from the left lumbar region to beyond the median line, and from the brim of the pelvis below to the margin of the ribs above. She had had it for fifteen years. Lately she had complained a great deal of colicky pains and troublesome constipation. The colicky pains had been so distressing that she had become addicted to the use of morphin to relieve them, and this in turn had promoted the constipation. The tumor had a very hard and smooth surface with somewhat irregular borders. Over the surface of the tumor there was dullness at some points, resonance at others. After explaining to her that it was very doubtful if it could be removed, I proposed an exploratory incision, to which she assented. I found that the omentum and small intestines were adherent to it; in fact, it seemed imbedded in them. It presented a somewhat broad, flattened, smooth surface which looked like bone or cartilage. Suffice it to say that it was clearly unadvisable to attempt its removal. The wound was stitched up and healed by first intention. Great irritability of stomach persisted, her strength failed and she died two weeks after the operation. A postmortem examination was made and the bones of a fetal skull at full term was found, with traces of the legs and arms. In connection with the left ovary there seemed to be a piece of the bone of an arm. Between this and the mass above there was no apparent connection whatever. Evidently there had been a tubal pregnancy of left side with rupture of the sac, the fetus having survived the rupture and continued to develop to full term in the abdomen, when death ensued.

Two other cases have fallen under my care, both of which I believe to have been tubal pregnancy with rupture.

Mrs. H., aged about 35 years, mother of five children, had eaten a hearty dinner including corn. In the evening she suffered from considerable disturbance of the bowels. While in the water closet she was taken with violent pains in the abdomen, with great prostration, vomiting, etc. When called to see her the next morning, Sept. 9, 1895, I found her almost pulseless, cold, clammy skin, suppression of urine and great tenderness of abdomen. There was also some bloody discharge from the vagina. This condition deterred me from attempting an operation. She never rallied, and died on September 14, five days from the time of the attack. No autopsy.

Mrs. D., aged 26, mother of three children. Had one miscarriage between the first and second child. Had passed her menstrual period some four or five days when the flow commenced, which she regarded as delayed menstruation. This continued for four days. November 15, 1895, it stopped suddenly. She supposed she had taken cold, especially as she had some pain. On November 18 she was taken with severe pain in the left pelvis which "doubled her up," as she expressed it, accompanied with some faintness and also diarrhea. I saw her in the afternoon. There was still pain, tenderness very great upon digital examination and upon suprapubic palpation, with quickened pulse, etc. I mentioned my suspicion of extra-uterine pregnancy, and suggested laparotomy, which she emphatically declined. In the meantime there was a return of the bloody flow. She had some fever for a few days, temperature reaching 103 F. and pulse 130. The flow continued for about three weeks. She gradually got better. Some fullness and great tenderness in left pelvic region, and which has not yet, May 21, entirely disappeared.

That some accident happened in this case, I think, can not be questioned. The clinical history, symptoms and subsequent history point to extra-uterine pregnancy.

---

## MODERN METHODS OF TREATING THE MAXILLARY AND OTHER SINUSES OF THE CRANIUM.

Read in the Section on Dental and Oral Surgery, at the Forty seventh Annual Meeting of the American Medical Association held at Atlanta, Ga., May 5-8, 1896.

BY W. XAVIER SUDDUTH, A.M., M.D.

FELLOW OF THE CHICAGO ACADEMY OF MEDICINE, CHICAGO, ILL.

*Pathology.*—The diseases to which the sinuses of the head are liable are many. The most common, however, are empyema, tumors and necrosis of the walls from syphilis, mentioned in the order of their importance and frequency of occurrence.

Empyema antri is a suppurative condition and arises in the maxillary sinus, in a large proportion of cases from infection through dental abscesses, although the records show a considerable number of cases that can be traced to the extension of disease from the nasal cavity. In some instances the local inflammation undoubtedly arises from occlusion of the osteum maxillare by polypi or inflammation and decomposition of the retained secretion of the cavity walls. The most common cause of obstruction of the natural outlets of the antri is nasal polypi situated around the opening. The final result in any case is suppuration within the cavity of the antrum.

In chronic empyematous conditions of the antral cavity the lining membrane is generally found to be thickened and spongy in character, the caliber of the

cavity in some cases is considerably reduced thereby. In not a few cases necrosis of the bony walls, results from the internal disease.

More or less intense neuralgias following the course of the nerve supply, together with sympathetic affections of the eye, resulting through the intimate nerve supply or caused by pressure of the inclosed pus upon the floor of the orbit, which also forms the roof of the antrum are found. These conditions are generally unilateral as empyema of the antrum is seldom bilateral.

*Symptomatology.*—The symptoms may be divided into two classes dependent upon whether there is occlusion of the osteum maxillare or not. In most cases it can also be said that the difference in symptomatology depends upon whether the disease arises from a dental or a nasal source, as occlusion of the osteum maxillare is most commonly, if not entirely, found accompanying the inroad of the disease from the nasal cavity.

Where obstruction of the natural outlet exists, there is a greater or less accumulation of matter within the cavity, with consequent pressure upon contiguous parts and more or less marked facial neuralgia. In some instances where the empyematous condition becomes chronic, necrosis of the osseous walls, most commonly on the nasal side, results and a copious discharge occurs into the nasal cavity. When the quantity of pus is large and does not find free outlet it may produce absorption of the orbital plate and infiltration into the tissues about the eye, in some cases producing glaucoma by involving the optic nerve.

In other instances the frontal sinus of the same side becomes involved as do also the sphenoidal sinuses, accompanied by marked supra-orbital neuralgia.

In empyema antri, without closure of the osteum maxillare, there is a more or less constant discharge of pus from the affected side, especially when patients lie upon the opposite side, a position seldom assumed because the discharge annoys them to such an extent they can not sleep. As a result of the constant discharge of pus into the throat, more or less interference of the general health follows. Dyspepsia and poisoning of the whole system results, which is indicated by a decided cachexia especially noticeable by the yellow appearance of the conjunctiva.

Diagnosis involves a differential consideration of the symptoms present in empyema of the several cavities of the head, including the diseases of the nasal fossa.

As pain is one of the constant symptoms, we use that as the first basis of comparison.

The diagnosis may also be established by exclusion, beginning with the maxillary sinus. Many different ways have been advocated to establish a diagnosis of empyema of the antrum. The simplest method is that of tapping with a curved hypodermic needle, through the nasal membrane, making the puncture in the inferior or middle meatus, and directing the point of the needle backward and downward. If there is pus present it may be accurately ascertained by such means.

Not every case of empyema antri should be opened, and great care should be used in making a diagnosis. Acute cases seldom come into our hands, by reason of the fact that nature restores the parts to a bearable if not a normal condition, and this fact should teach us a lesson regarding surgical interference in acute cases.

Transillumination has been advocated by some, but has failed in the hands of even the most expert specialists when put into actual practice. I have used it in several cases but with indifferent success. In one case it was used before tapping and drawing off a considerable quantity of pus, and then again afterward, but no noticeable difference in the appearance could be observed.

The one remaining condition to be differentiated from suppuration of the antrum is feted ozena. Rhinoscopic examination will, in all cases, establish the diagnosis, as in the latter condition the disease of the mucous membrane will be readily observed, and, in all probability, found to be bilateral; while empyema antri is, in a large per cent. of cases unilateral.

The greatest difficulty in the diagnosis is found where complications arise by reason of several of the cavities being diseased at the same time. These cases do not come to the dental practitioner for treatment as often as they pass into the hands of the nose and throat specialist. Empyematous conditions of the antrum are generally of a purulent nature from the beginning, by reason of the fact that the cause generally lies in the discharge of a collection of pus from an alveolar abscess into the antrum.

Treatment of these cases is best directed from within the oral cavity, although the same methods may be adopted of introducing a tube through the nasal septum as before described. This is preferable to sacrificing a fairly good tooth or even trephining the outer plate in the region of the canine fossa. The latter should invariably be done, if the patient, for cosmetic reasons, objects to having the tube exposed upon the face, for if it is introduced through the outer plate it may be entirely concealed within the mouth. The method to be adopted is as follows: Select a trephine and a flexible rubber catheter of the same caliber, No. 7 or 8 being the size I generally use, and place them in an antiseptic solution.

Have the patient rinse the mouth thoroughly with a borated soda solution or listerin; dip the trephine in carbolic acid solution 5 per cent, or inject the tissue in the region where it is intended to insert the instrument with a 4 per cent. cocain solution and then make the opening and apply first dressing through this; then insert the tube, which should be ligated to a band or clasp that had previously been made and cemented to a conveniently located tooth. A short piece of tube or piping should be soldered to the band before putting it in place. The rubber tube should be about three or three and one-half inches in length, so as to enter the antrum from one-half to three-fourths of an inch and leave two inches outside. The free end should be kept plugged with a soft wooden pin, so as to prevent the saliva and air from entering, both of which may become a source of infection.

After placing the tube, the antrum should again be washed out thoroughly with a biborate of soda solution, the fluid to be introduced through the tube and allowed to flow out through the natural opening into the nasal cavity, the patient being instructed to incline the head forward. If the opening is found to be closed or too small to permit the fluid, on which the pus freely floats, to pass out, then a freer opening should be made. After the cavity has been thoroughly cleansed by the soda solution, a 3 per cent. pyrozone solution should be introduced and permitted sufficient time to disintegrate the remaining pus, if any, after which as a final dressing some bland antiseptic, such

as a well diluted listerin, should be thrown into the cavity, and allowed to remain.

If the patient is told to lean forward when the washing out process is begun no part of the discharge will pass into the mouth or throat, a point that will be greatly appreciated. In like manner tubes may be inserted into all the cavities of the cranium and the cavities should be washed out two or three times a day. By aid of the tube this may be done by the patient or some member of the family and the case need not be seen by the practitioner more than twice or three times a week at the most.

If there is any odor at the second sitting, permanganate of potash should be substituted for the listerin, for a few days. As soon as the quantity of pus becomes lessened, then a stimulating antiseptic should be substituted. I do not know any that is better than sozo-iodol and its compounds. Sozo-iodol and bismuth in acute cases, sozo-iodol and mercury for sub-acute, and sozo-iodol and zinc for chronic cases. These should be used in the strength of about one-half grain to the ounce of distilled water. All solutions should be warmed before using, including the $H_2O_2$, which may be done by placing the vessel containing the fluid in a dish of hot water.

If neuralgia follows the washing process, it is generally indicative that the astringent solution is too strong.

## A DISCUSSION ON ANATOMY OF THE ANTRUM OF HIGHMORE.

Read in the Section on Dental and Oral Surgery, at the Forty-seventh Annual Meeting of the American Medical Association at Atlanta, Ga., May 5-8, 1896.

BY M. H. FLETCHER, M.S., M.D., D.D.S.
CINCINNATI, OHIO.

The two following quotations are from the discussion on a paper by the present author, entitled "What a Dentist saw in Examining 500 Crania," read before the Mississippi Valley Dental Association, April 18, 1895.

Dr. J. E. Cravens; "I believe that if the Doctor had examined the skulls in the living subjects he would have found his proposition a mistake. I believe that nature never pushed the apex of a tooth root into the Highmorian cavity, without a bony protection, however thin. She never completed the apex of the root of a tooth in the mucous membrane alone."

Dr. H. A. Smith: "I doubt very much the entire absence of bone. If the position taken by Dr. Fletcher is true it may account for certain lesions, phases of facial-neuralgia. I doubt very much if the root of a tooth ever penetrates the antrum. You must have a thin covering of bone. The bone of the antrum is proliferated by its own periosteum, and does not depend on any tissue of the teeth. If you take those skulls and examine the roots of the teeth you assume that they never had a covering of bone, but they may have had, even though it was as thin as paper. If you examine those skulls, where the bone is denuded it is so thin that in the dry state it falls away. An observation made on a dry skull is not conclusive. If it is true that the roots will penetrate the antrum it will account for a great many of those cases of facial neuralgia."

These criticisms were brought out by the following statement made in the paper referred to:

Dr. M. H. Fletcher: "As to diseases of the antrum, it seems to me that these people were remarkably exempt, when we consider that they could have had no surgical or medical attention, and also that about 25 per cent. of them had abscessed upper molars. This fact is significant when it is claimed by the majority of authors that diseases of the antrum come more frequently from this class of teeth than from any other source. This series of examinations show that out of the 252 cases of abscessed upper molars, only 12 perforated the antrum. This would seem a remarkably small number and indicate that abscessed teeth do not cause antral trouble as often in comparison with other causes of inflammation of this cavity as most authors maintain they do."

My reasons for believing that the teeth may often be affected by diseases of the antrum are strengthened by considering a certain feature of the anatomy of the parts, mentioned by Gray, and omitted by most other anatomists, that, "in some cases the floor is perforated by the teeth in this situation." I found this to be the condition in twenty cases, showing that about 4 per cent. of persons have, normally, nothing covering the apices of these teeth but mucous membrane (I wish to say that the statistics on this particular point are not accurate, on account of the inability to see into the antrum, in an unbroken skull). Many skulls were broken, however, so that the examinations could be thoroughly made on this point, as well as others, and when they were not broken the sense of touch was used to determine the presence of bony processes, septa and the general form of the cavity, and the normal openings above the teeth, as far as possible. It was also observed that these normal openings occurred where the floor of the antrum was comparatively flat, and not where there was a conical process, and that these cases where the conical processes occurred were almost invariably covered with a considerable thickness of bone.

These conditions being present, it would seem a natural result when the mucous membrane of the floor of the antrum becomes broken down, for the blood and nerve supply of teeth (so perforating the floor) to be interfered with, and possibly entirely destroyed, since the apical foramen of the teeth must be exposed to these destructive influences. In cases of occlusion of the osteum maxillare and other openings into the nose, the antrum may become tensely engorged, and under this condition if there be no bony covering to the apex of the teeth, it would be more or less driven from its socket and become very sore to the touch.

It is my belief that if accurate statistics could be had they would indicate that the exciting causes of diseases of the antrum is ten to one in favor of intranasal disorders. I make this statement, taking into consideration the large per cent. of teeth that are known to perforate the bony floor of the antrum, for my observations also show that a much larger number of teeth are denuded of bone on the buccal surface of the alveolus, hence, the large preponderance of abscessed teeth which discharge in this locality, a place where one familiar with the disease invariably looks for a fistulous opening. In this situation, if the bone is not entirely absent in some spot, it is so thin that it offers to internal pressure the least possible resistance of any other part of the sockets of the teeth.

During the discussion of the paper referred to I corrected the statement that "These cases have, normally, nothing covering the apieces of the teeth, but mucous membrane." The words mucous mem-

brane should read soft tissues, meaning periodontal and mucous membrane.

I was led to the above statement from the fact that many instances were found (about 4 per cent.) where the apices of the teeth perforated the bony floor of the antrum, having no bony covering, and by close examination it seems clear to me that this condition obtained during life, especially since one case was found among the recent specimens of the Army Medical Museum when the skulls and recent specimens were being examined.

Within the past few weeks I have examined twenty more recent subjects on this point as well as others, and found a case where nothing but soft tissue covered the apex of a buccal root of a first molar. These two cases show that such a condition does obtain during life, and furnish a good foundation for the belief, that when skulls are found with no bony covering to the apices of the teeth, that during life they probably had no other covering than soft tissue.

Since writing the paper referred to, three cases of empyema of the maxillary sinus have come under my observation, none of which were in any way traceable to disorders of the teeth, but in each one the exciting cause was intranasal; thus adding to the evidence that the trouble is due in the larger number of cases to intranasal disorders, as claimed in former papers.

Illuminating these cavities by the mouth lamp, is a most valuable adjunct to diagnostic symptoms; the three cases referred to, all threw the diagnostic shadow.

## THE TECHNIQUE OF RESECTIONS OF THE SKULL.

BY ALLEN DEVILBISS, M.D.
TOLEDO, OHIO.

Surgical work should not be undertaken until the nature and location of the disease is first determined. In a limited number of cases it may be advisable to remove portions of the cranial bone or bones for explorative purposes. Localization of cerebral functions has made it possible in certain cases to make an accurate diagnosis. There are large portions of the cortex, that the functions of are not understood, but the sensor motor area, the visual area, the speech area, the auditory area, and the areas of sensations of smell and taste are known, and these facts in connection with the various symptoms will generally guide to a correct idea of the nature and situation of the lesion.

Trephining may be performed for the removal of foreign substances, spicula of bone, depressed bone, blood clot, the opening of an abscess, the removal of cysts, excision of tumors, for the relief of intracranial pressure, for drainage, etc. Any one of the conditions just mentioned may be the cause of epilepsy, insanity, paralysis, or most any of the brain lesions with which we have to contend.

While I do think that we should not hasten to operate in all cases, yet we must remember there is danger in delay. Delay of surgical interference in recent fractures has often resulted in death or brought about conditions that make death preferable to life. We should not hesitate to open the mastoid cells when there exists an abscess. If done early, it is sure to prevent further mischief, but if left alone quite a proportion go on to infection of the lateral sinus, meningitis or abscess of the brain. The success of cerebral operation depends upon every detail of aseptic surgery being carried out to perfection.

The marking off on the scalp, for the fissures of Rolando and Sylvius, is necessary in many cases and should be done before giving the anesthetic. To accomplish this, various rules have been given. Owing to the difference in shape and size of the head no land marks can be taken that are constant in their relations to the fissures, but are sufficiently so for surgical purposes. The plan that I have used is principally one of my own, and I think, it is quite definite and not complicated. I use a flexible metallic tape for measuring, and tincture of iodin for marking. First, measure from the glabella over the top of the head to the occipital protuberance, half of the whole distance plus one-half inch back will correspond to the upper end of the fissure of Rolando; mark this point, then place one end of the flexible measure upon the point marked, and carry it along the side of the head down to the angle of the mouth. Make a mark by this line at a point, three and one-half inches from the mark on the median line. The imaginary line

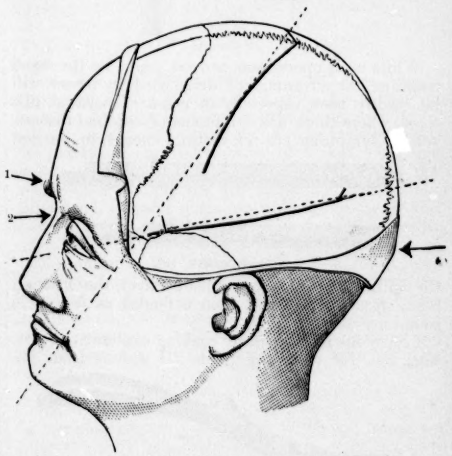



FIG. 1.—1, Glabella; 2, Nasion; 3, Inion.

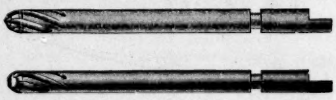
between the points marked will lie over the fissure of Rolando except at its lower portion which is more vertical. To find the fissure of Sylvius place one end of the tape at the lower end of the nasal bone, carry it along in line with the external angular process of the frontal bone to a point three-fourths of an inch below the parietal eminence; then make a mark at a point one and one-fourth inch back from the external angular process. From this point count off four inches and mark. A line drawn from one of these points to the other will correspond to the fissure of Sylvius. The anterior limb of the fissure is about two inches behind the external angular process. By continuing the Sylvian line to the median line we form a junction at the point where lies the parieto-occipital fissure.

All the areas now known can be located with a definite relation to these three fissures; hence no further rules are necessary. With the landmark made for the fissures and the patient anesthetized, we are ready to make the incision through soft parts.

This may be done with one stroke of the knife. We are now ready to make the initial opening through the bone to the dura. This can be accomplished in several ways. After trying the various devices used, I prefer to use a small-sized cone-shaped trephine, three-eighths of an inch on its face, which makes an opening of sufficient size to allow the easy passage of the lower jaw of the forceps down to the dura. Its advantages over other trephines are: 1. Its centering point can be held in position until placed upon the part to be operated upon, and when it has cut deep enough for fixation, the centering point may be removed. 2. The central opening being carried twice the length of the cutting cylinder with a recess above the cutting part to allow the bone button to be shoved up through and fall out, which makes it easy to clean.

FIGURE 2.

While most operations can be made by the hand trephine, the advantage of drills used by power will be readily seen, especially in cases of mastoid diseases, where there are symptoms of cerebral disease, yet the symptoms are not distinct enough to warrant



FIGS. 3 and 4.

the initial opening to be made direct, the mastoid being first opened and then extended as far as is found necessary.

I have one small drill for making explorative openings, also for enlarging them. It widens from the

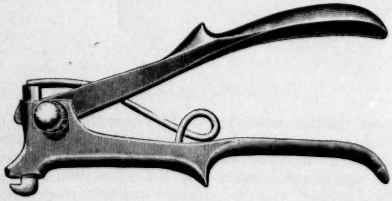


FIGURE 5.

point up and has a cutting edge on its end and side. This causes it to lock and stop when the point is ready to pass through the bone; there being no more bone to cut with the point, the side of the drill is pressed into the wall of the hole. This stops its revolving just when the hole is completed, or when there is only a thin sheet of bone not thicker than writing paper left, which may be pushed out with a probe-pointed drill, or cut out with a stop drill by holding it back so that it can cut but little at each revolution to prevent its locking. In this way, the first opening is made without danger of wounding the tissue beneath the bone. When using this drill it is best to instruct the person furnishing the power to stop turning as soon as the drill locks. By so doing there will be no unnecessary strain upon the cable. I also have one side-cutting probe-pointed drill that I use wherever there would be danger in wounding tissue by the one with the sharp end. They do the work in less time than it can be done with the chisel or gouge and without jarring. They are now machine ground and are very accurate and will not heat if run at a proper speed. The harder the bone the less speed should be used. The same law that governs the speed in drilling metal applies to the drilling of bone. When the initial opening is made directly through the skull bone to the dura and I wish to enlarge it, or cut a slot out or make a trap-door, I use a bone-cutting forceps that I have devised for this purpose. It will cut a slot in any direction desired. The lower jaw shoves the piece cut off out through the upper jaw, leaving the edge of the bone smooth next the dura. The under-surface of the lower jaw being round and smooth serves as a dural separator. The leverage is such that there is no difficulty in biting through. After the slot is two inches long, it is best to take

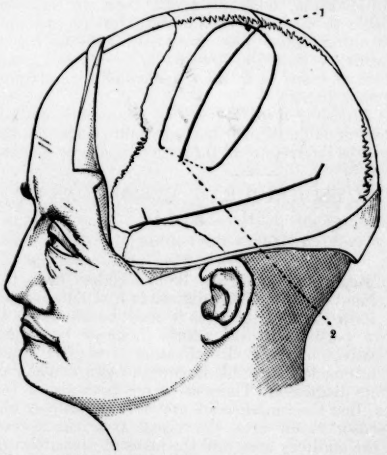



FIG. 6.—1, Point of initial opening: 2, Fracture line. Forceps should be turned at each end of fracture line as shown.

side bites so as to make an opening large enough for the lower jaw to pass through and not go back to the place of beginning. It can be made aseptic, as its parts separate by removing the thumb screw. I use a jaw that cuts one-eighth of an inch. Some prefer one only one-sixteenth inch so as to have bony union instead of fibrous.

The lower jaw is made so that it does not fit closely the opening in the upper one. By having a little space left it clears itself better and yet leaves the bone smooth next the dura. There may be slight nicking of the external surface of the bone, which is immaterial. I have used the lower jaw flat upon its face and also deeply cupped. I find that this makes but little difference in regard to the smoothness of the surface or the ease with which it is accomplished. I have used it many times and I find no bleeding from the diploe. It is prevented on account of the way it shoves the bone out. When making a trap-door brain operation of sufficient size to cover motor

areas, situated along the fissure of Rolando, say two by three inches, I have adopted the following plan: Make an opening at the center of the upper end of the portion to be turned over; then take the forceps and bite out piece after piece until the point to be fractured across is reached; then turn the forceps in the direction of the line to be fractured and take a bite or two; next cut out from the central opening to a point where the other end of the fractured line is to be, take a side bite or two in the same manner as done upon the other side. This leaves the part to be fractured across weaker than at any other point and can be easily broken. Next take a vectus and lift or pry it up and break it over. After completing the work necessary within, the flap may be returned. The fractured end may be placed even (or up, if need be, to increase intracranial room), and the rough surface of the fractured parts will hold it in place, if pressure be maintained until it is put in proper position. The semi-circular or horse-shoe-shaped bone flap with soft tissues attached and continuous with the scalp at its base which contains the blood supply for the parts,

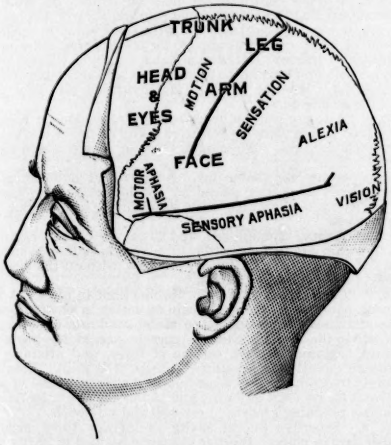



FIGURE 7.

are to be preferred to any other procedure except in recent fractures; no extension of the incision should be made in the direction of the line of the fracture, nor is it necessary to do any chiseling or cutting of any kind of the bone along the line to be broken. The connection between the soft parts and bone should be disturbed as little as possible.

For operation upon flat bones there is no other instrument equal to the forceps that I have described to you, whether it be by skilled or unskilled hands. In unskilled hands it is certainly safer than the chisel and mallet, for the reason that when the instrument is placed in position to bite, it shoves the dura out of the operative field, and by its use the injurious effects are prevented that may occur from the blows when the chisel and mallet are used.

When using it I prefer to take the lower handle in one hand, the upper one in the other, so that I can carry the bit up or down at will, and place firmly its stem against the bone, in this way a full bite can be taken out each time. A large trap door can be made in from five to ten minutes. That there are more permanent cures made by this plan of operating I have described, I can not say, but I can say that death and other bad results from shock incident to the prolonged use of the mallet and chisel may be prevented.

Many surgeons have used it in making craniectomies and proved its usefulness; but this is not its only field, it extends to thoracoplasty and laminectomy and all bones that are thin enough to come within its jaws.

When in Chicago recently I found this instrument in use in several of the schools.

## CATAPHORESIS.

Read in the Section on Dental and Oral Surgery, at the Forty-seventh Annual Meeting of the American Medical Association, held at Atlanta, Ga., May 5-8, 1896.

BY HENRY W. GILLETT, D.M.D.

NEWPORT, R. I.

The primary facts upon which the present practice of cataphoresis are based were first discovered, nearly forty years ago, by Dr. B. W. Richardson. The development of practical results from these facts has been slow, but the past five or six years have added much to the general knowledge and application of them.

The fact that the galvanic current does, under proper conditions, carry with it into the tissues of the body, fluids and the substances they may hold in solution, is now sufficiently well known and accepted. The practical realization and use of this fact has not been general for numerous reasons, but now that the principles of the process are becoming more widely understood, it seems quite probable that some of the most important applications of this method of medication will be in the treatment of the oral tissues.

The dentine of the human tooth, which, for generations, we have been wont to consider practically impenetrable by drugs, has, by reason of our better understanding of the process of cataphoresis, changed its relative position, and may now be considered one of the tissues easily penetrated and influenced by drugs.

The very fact that has made it impossible for us to cause absorption of drugs into dentine, namely, its comparative non-vascularity, is an aid when we apply them by cataphoresis. Into a very vascular tissue it is difficult to feed a cocain solution with sufficient rapidity to produce a deep effect, because the blood current washes it away and spreads it through the system. In dentine this does not occur.

There are material differences necessary in the apparatus to be used with success for treating sensitive dentine, and that which may be used for other tissues. For some subjects almost any voltage of current may be used if it is choked down in quantity; but a large percentage of the subjects who most need the aid of this method will be found too sensitive to the effect of the galvanic current to allow of its use on sensitive dentine, unless the apparatus is so arranged that the voltage may be reduced to a very low point at the start, and gradually increased, in small steps, to a point where it will be efficient in producing cataphoric effects in a reasonable time. McGraw used the ordinary battery apparatus in 1888 for treatment of dentine, but gave it up because of crudeness of apparatus. With such apparatus it is necessary to either commence with the full voltage, or to add it in

steps equal to a whole cell (equal to about a volt and a half).

Recently apparatus has been described in the *International Dental Journal* for using the 110 volt current choked down in quantity, without modifying the voltage, and also apparatus for using a storage battery fitted to produce a twenty volt current, and choking the current from that. Methods and apparatus giving the same currents were used by your essayist in his early work in cataphoresis.

In order to extend the range of application for the method, an apparatus, since named a volt selecter, was devised. The completed instrument has been called by the manufacturers the Geo. M. Wheeler Fractional Volt Selecter, and it is the most suitable apparatus obtainable for making applications of electricity to sensitive dentine. When connected to the 110 volt circuit, it allows the operator to command at will any voltage of current, from less than one up to forty, in quarter volt steps, or by turning a switch, the voltage at command may run up to eighty in half volt steps. An instrument of the same type may be connected to sets of batteries, and any voltage from one extreme to the other of the set is at the command of the operator. There is a marked advantage in having this capacity to graduate the current to any desired voltage, since it enables the operator to begin with a current that any and all patients can bear without discomfort, and to increase the current very gradually up to such point as the individual patient may be found able to take without objection.

For a résumé of the prominent points in the history of the development of the use of cataphoresis, I would refer to a paper which was published in the February, 1896, number of the *International Dental Journal*, in which I drew largely from Bigelow's International System of Electro-therapeutics.

My first work was commenced with the belief that cataphoresis was possible in dentine. A few trials on my own teeth with the 110 volt current, choked with the ordinary rheostat, demonstrated the correctness of this belief. This first apparatus was tried in practice, and found usable for a few patients. It was modified so as to furnish a sixty volt current, which extended its applicability, but it was still not useful for general practice, and the voltage was further modified till it was demonstrated that the apparatus which would eliminate the difficulties which were met with, namely, pain and irritation, was one with the qualities mentioned above. An apparatus was accordingly made by which the voltage in the working circuit could be modified at will. This somewhat crude apparatus proved to be a practical office instrument. It was used for some months in my practice and proved equal to all cases for which it was needed, although there were some cases where the steps by which the current was added proved to be too large for the comfort of the patient.

Having brought the principle to a workable condition, it was handed over to a manufacturing company for development, and a successful instrument with many conveniences and improvements is the result.

Nearly all my work with cataphoresis has been in obtunding sensitive dentine. For this purpose I have generally used a strong cocain solution, 20 to 30 per cent., applied on cotton in the cavity of decay; the positive electrode, platinum tipped, being placed on the cotton, and the negative (ordinary wet sponge) electrode applied anywhere on the surface of the body.

It is not absolutely essential that the rubber dam be used, but it is very desirable; also that any metallic fillings which are so placed that they may make good electric connection with the current, be insulated by covering them with some non-conducting material like varnish, wax or gutta percha. If this is not done, considerable pain from the current may be expected.

I quote some experiments from the article mentioned above:

No. 1. A 15 per cent. aqueous solution of cocain on cotton wound on positive electrode, applied to back of right hand, at a point where the sensibility to the prick of a fine instrument had been tested: the negative electrode wet with a salt solution, applied to the palm of same hand. One milli of a seventeen volt current passed for ten minutes. Result: Absence of superficial sensation, and I was able to pass an instrumeut through the skin without pain over the area covered by the positive electrode.

No. 2. A 15 per cent. aqueous solution of cocain applied on cotton to corresponding point and under the same conditions on back of left hand; no current used. At the end of ten minutes there had been no appreciable modification of the sensitiveness.

No. 3. A 10 per cent. salt solution, on cotton, on positive electrode, applied to another tested point on back of left hand, and negative sponge electrode wet with same solution applied to palm of hand. Current applied for ten minutes, reaching a maximum of thirteen volts and about four millis. There was so much pain and burning as to make this a disagreeable experiment to try. Result: Redness and irritation, but no effect upon the sensitiveness.

No. 4. A 15 per cent. aqueous solution of cocain on cotton was placed in a moderately sensitive cavity of decay in a tooth for fifteen minutes. No modification in sensitiveness took place.

No. 5. Same case; same day. A 15 per cent. aqueous solution of cocain on cotton, placed in another moderately sensitive cavity for ten minutes, with no resulting modification of sensitiveness.

No. 6. Rubber dam applied, and 25 per cent. aqueous solution of cocain applied on cotton to a very sensitive bicuspid cavity of medium size for twenty minutes, without the slightest effect upon the sensitiveness.

No. 7. Same cavity as No. 6. Rubber dam in place. A 25 per cent. aqueous solution of cocain on cotton in cavity; positive platinum electrode applied to cotton, and negative sponge electrode to the cheek. Electric current passed for thirteen minutes, beginning with a voltage of three, and attaining a maximum quantity of about two-thirds of a milli. Result: Absolute freedom from all sensation to the vigorous use of an excavator for removal of decay, and to the use of bur for forming ample retaining grooves in cervical and side walls.

No. 8. Sensitive buccal cavity in inferior third molar. Rubber dam in place. Positive electrode applied in cavity to cotton saturated with 20 per cent. sodium chlorid solution. Current applied for twelve minutes, reaching a maximum of eight volts and one milli. Much diffused pain resulting while current was applied, but no anesthetizing effect.

No. 10. Same cavity. A 15 per cent. aqueous solution of cocain instead of the salt solution. Current applied during eleven minutes, reaching a maximum of ten volts and about two-thirds of a milli. No diffuse pain, a very little in tooth. Result: A marked lessening of sensitiveness of whole cavity, and entire removal of it in a large part of cavity.

As a rule, this class of cavity requires longer applications than approximal cavities, and it is sometimes difficult to affect that part of the cavity which is out of the path of the current.

No. 11. Coronal cavity in left superior second molar. Quite sensitive. Placed in a .5 per cent. solution of sodium chlorid on cotton in the cavity and applied current for ten minutes, beginning with a voltage of less than one, increasing it to eight and a half at the end of the ten minutes. The milliampere meter then recorded about a half milli. I was unable to work the current up faster because of the pain it caused. The sudden turning off of the current at the end of the ten minutes gave a very decided sensation (kick or kink, patients often call it) in the tooth. The sensitiveness of the dentine to the excavator had not been in the least diminished.

No. 12. Same cavity as No. 11. A 25 per cent. aqueous solution of cocain applied in this way, beginning with same voltage. After the first two or three minutes it was possible to increase the voltage much more rapidly, without undue

pain, than was possible with the salt solution, this fact being seemingly due to the beginning anesthetic effect of the cocain. At the end of eight minutes seventeen volts (or twice the quantity given in No. 11) was being administered, and with less pain. At the end of ten minutes there was no pain. The milliampere meter recorded about three-fourths of a milli. When the current was suddenly cut off, there was much less of the "kink" noted by the patient—another indication of deep cocain effect. Upon vigorous use of the excavator, the dentine was found *absolutely* free from all sensation. It should be said that this patient and the one for experiments Nos. 6 and 7 had never had the process used before, and that no explanations were made beyond the statement that I was going to try to relieve the sensitiveness, and that they should not be hurt.

"The results of these experiments may be summed up as follows: Ten per cent. aqueous solution of cocain applied on the positive electrode with a weak electric current for a few minutes will anesthetize the skin. A similar cocain solution applied for the same time without the current has no anesthetic effect. The same electric current without the cocain has no anesthetic effect. Cocain solutions of from 15 to 25 per cent. applied in sensitive cavities, for ten or twenty minutes, do not modify their sensitiveness. The electric current alone applied to sensitive dentine, sodium chlorid solutions of varying strengths being added to insure good electric connections, does not perceptibly modify the sensitiveness.

"Cocain solutions and the electric current applied to sensitive dentine, together, *do* completely anesthetize it; consequently the cocain is the active agent.

"It seems probable that the exhibition of other drugs may produce the same results, and I have other experiments preparing to demonstrate the facts. I hesitate less about reporting results with cocain without lengthy trial than with most other drugs, since, theoretically, it can do no possible harm to the tooth.

"The effect of the cocain in these applications does not seem to reach deeply into the dentine in most cases. By prolonging the application, however, the pulp may, in favorable cases, be anesthetized, even through a layer of dentine.

"It is quite often the case that a ten- or twelve-minute application will anesthetize the dentine deeply enough to allow the greater portion or all of the cutting to be done painlessly, but for deep grooves it may be necessary to repeat the application. In cases where there is much sensitiveness, and consequently much time will be required to prepare the cavity, I find the time required for applying the cocain is fully made up by the increased speed possible after the sensitiveness is under control."

I would also quote from the same some directions for making the application:

"I always apply the rubber dam, as it is difficult, and often impossible to prevent leakage of current through other tissues if this is not done. Any metal fillings which will be in contact with the wet cotton in the cavity or with the electrode must be covered. The current from a metallic surface into dentine is irritating and painful. I find Gilbert's temporary stopping a very useful material for this purpose. Wax or varnish will also do. In cases where I am working on an approximal cavity in one tooth, and a filling in the next tooth is too close to allow of its satisfactory insulation, I apply the rubber at first over the tooth to be worked upon, thus insulating it completely; or, if the rubber is already in place a second rubber may be applied over the tooth to be worked upon. The positive electrode should be of platinum as most other metals are affected by the current, and are liable to stain the tooth. These conditions being provided, be sure that your current is turned on. I always test this by touching the metal parts of the electrodes together, and watch the milliampere meter to observe the result.

"This selecter is so arranged that when the needle is at zero, and contact of electrodes is made as described, about one milli will be recorded. Getting this result assures the operator that all connections have been made, and that the apparatus is ready. If, however, a larger quantity of current is indicated by the milliampere meter, it shows that the rheostat contact is not at the right place. This same proceeding would also serve to detect any break-down in the rheostat if it had occurred. Twenty seconds serve to assure the operator on these points, if his apparatus is conveniently placed. I then wet the negative sponge electrode with water or dilute salt solution. I place in the cavity a pellet of absorbent cotton saturated with a 20 to 30 per cent. cocain solution. I prefer not to have this cotton extend outside of the cavity, and to keep the solution confined to the cavity as much as possible. This concentrates the current in the part I desire to affect.

"The negative wet sponge electrode I usually allow the patient to hold. It is preferably to be applied about the face or neck, as near the tooth as is convenient. Having placed this and allowed the patient to take it, I apply the positive electrode to the cotton in the cavity, and begin slowly to increase the current by turning the large fiber knob of the rheostat head in the direction indicated by the needle which records voltage. The first consciousness of the current sometimes comes to the patient as the typical little "kick" or "kink" of the galvanic current, but it is a very small one with this selecter. More often the patient is only conscious of an indefinite, gradually increasing pressure, and if the current is pushed too rapidly this may increase to pain. It is therefore necessary to watch the patient carefully, and to pause in the turning-on process as soon as the change in the eye of the patient indicates that he is beginning to feel the current to an uncomfortable degree. After the first experience, if cautiously managed, a patient will usually give the operator all necessary indications for his guidance, and allow him to keep the current up to a point just short of pain. After one experience with it, the sensation is readily borne, even by sensitive children of twelve or fourteen.

"As the operator pauses at the point where the patient indicates that the current is strong enough, or even turns back a little if there is too much current, it is well to assure the patient that any disagreeable sensation will subside promptly. It usually does this in from one-half minute to two minutes, and then the voltage may be increased slowly and gradually, with pauses long enough for any disagreeable sensation to disappear.

"Subjects differ very much in the amount of current they will bear without discomfort. It is usually found, however, that by very gradual increase, and by taking more time to reach the maximum in these sensitive cases, a sufficient amount may be applied, to any case, to attain the result of anesthetizing the dentine.

"It is my habit, as soon as I have opened into a sensitive cavity, to make an application lasting from eight to twelve minutes. If I have reason to expect difficulty with the case, I make the application longer. If the first application is not sufficient for all I wish to do, I repeat it later.

"I have some ten or twelve cases on record where twenty to thirty minutes have been needed to produce sufficient effect. These were all cases where both patient and operator felt compensated for the time spent. Most of them were either extremely sensitive teeth or subjects who could bear but little current, and several of these cases would have been all but impossible without the aid of this method. On the other hand, I had numerous cases where ten or even eight minutes had been ample time for successful results. Having reached a voltage likely to be sufficient, I allow it to stand at that point till the end of the application. Fifteen to twenty volts will usually be attained in seven or eight minutes. In many cases, with small cavities and little sensitiveness to the current, twenty-five or thirty volts may be marked in the same time. The higher voltage works more rapidly. At the end of the application, I usually break connection at the negative electrode, as there is less often shock in so doing. If the subject is very sensitive to the current, I turn the voltage down low before breaking connection. Having concluded the application, I turn off the current in the selecter by means of the switch. This lever may also be used for concluding the application of current if you find no objectionable shock resulting. Then I test the cavity, and finding it all right proceed as usual, bearing in mind that the effect may not have gone as deeply as I wish to go with my instruments, so it is still necessary to watch for signs of returning sensitiveness."

No ill effects are to be expected from the application. In no case have I seen any symptom which would contraindicate the use of cocain and the current for sensitive dentine.

It has been proposed to utilize the anesthetic properties of guaiacol in this way, and combinations of guaiacol and cocain have been used with success. It is claimed that the use of guaiacol will reduce the time needed for the application to prove effective. Unfortunately, it has an unpleasant odor, and escharotic properties which lead to its being used with caution. It is to be hoped that the firm now at work upon this combination of drugs will succeed in eliminating its escharotic properties and in overcoming its odor. If this can be done, it will aid us, since the

time required for producing anesthesia of dentine is the chief objection to the practical use of the method, and this drug may probably reduce the time. It is quite possible that the drug is not sufficiently escharotic to work harm in the dentine, but it would seem desirable to use it with caution till more is known of its effects. With guaiacol and cocain it would be less necessary to use the rubber dam, and it would also be easier, with the escharotic properties eliminated, to produce effects on the gum if it were desired to use the method there. The combination has been used successfully for anesthesia in extraction, implantation, and skin surgery. On mucous membranes the subsequent sloughing is objectionable. On the skin it is said not to produce ill effects.

For bleaching teeth a 25 per cent. aqueous solution of $H_2O_2$ will prove successful if used as directed for cocain. The cotton in the cavity needs to be kept wet with fresh solution and stronger currents may be used than in living teeth.

When a commercial system is used as the source of power, it should be one that furnishes a steady current. A system subject to large intermittent demands upon it is not satisfactory in this respect. It needs also a well-appointed and well managed central station in order to be successfully used for this purpose; otherwise the irregularities due to imperfect machinery will be disastrous. Any primary or storage battery of sufficient capacity will do well. The manufacturers of the selecter have made one to be used with a set of dry batteries that impresses me very favorably. It is certainly a most convenient form of battery, free from the objection of requiring constant care, and much less liable to injury than storage batteries. It is essential that the selecter be fitted to go with the particular battery provided.

The most formidable objection to this process for the treatment of sensitive dentine is the time required. On this account, its best field is in the cases of extreme sensitiveness that require so much time and care for their preparation. I anticipate that the result of the general use the process is fast attaining will be the development of improvements which will reduce the time required.

---

## EXPERIMENTS ON THE RUSTING OF INSTRUMENTS IN STERILIZATION BY BOILING.

BY EDMUND ANDREWS, M.D.
CHICAGO.

Every one knows that if steel instruments are sterilized by boiling in pure water, they become covered with spots of rust. It is usual to guard against this by adding to the water 1 per cent. of sodium carbonate. Some surgeons complain that this process gives no uniformity of result, their instruments sometimes coming out bright, and sometimes badly spotted.

As the rusting is a simple chemic process, the results ought always to be the same if the conditions are uniform. The following experiments were made to ascertain the effect of boiling under different conditions. A quantity of thin polished steel plates, each one inch wide and two inches long, were made for me by a cutler. These were washed well in ether, and then soaked in a bath of ether for some hours to remove all oily matter from the surface.

Also two plates of aluminium, each two inches square, were subjected to the tests, and two bright scalpels, one with an aluminium handle and one with a German silver handle. These scalpels were selected to see if the presence of different metals in the same bath caused any galvanic action at the expense of the steel blades. For the same reason two plates of steel were laid on a plate of zinc and boiled.

Experiment 1. Two plates of steel were boiled twenty minutes in distilled water. They began to rust in two minutes, and in twenty minutes large elongated spots of black rust covered 30 per cent. of the surface.

Experiment 2. Several steel instruments were exposed to a steam bath over boiling water for twenty minutes. They came out much spotted with black rust.

Experiment 3. Two steel plates were boiled in Lake Michigan water, which is purer than ordinary Western well water, but contains small traces of chlorids and sulphates, being slightly "hard." The plates began to rust in two and one-half minutes. In twenty minutes about one-quarter of the surface was covered with small black spots.

Experiment 4. Two steel plates were boiled in water from a country well dug in the boulder drift. It was very "hard" water, owing to the presence of soluble chlorids and sulphates. In twenty minutes they were taken out and only one-twentieth of the surface was rusted, showing that hard water is better than soft for this purpose.

Experiment 5. Two plates were boiled twenty minutes in Lake Michigan water with 1 per cent. of sodium carbonate added. No rust at all.

Experiment 6. Two plates boiled twenty minutes in Lake Michigan water containing 1 per cent. of sodium bicarbonate. Not a particle of rust.

Experiment 7. Two plates boiled twenty minutes in very hard country well water containing 2 per cent. of green soap. Not a particle of rust.

Experiment 8. Two plates boiled twenty minutes in Lake Michigan water with 2 per cent. of green soap. No rust.

Experiment 9. Two plates boiled twenty minutes in Lake Michigan water with 2 per cent. of ordinary toilet soap. No rust.

Experiment 10. Two plates boiled twenty minutes in Lake Michigan water containing 2 per cent. of boric acid. Began to rust in two and one-half minutes. In twenty minutes there were many minute specks of rust.

Experiment 11. Two plates boiled twenty minutes in Lake Michigan water containing 1 per cent of sodium chlorid. Twelve per cent. of the surface was rusted.

Experiment 12. Two plates boiled twenty minutes in pure Lake Michigan water, lying on a plate of zinc to test the galvanic effect. Twelve per cent. of surface rusted in large spots.

Experiment 13. Two scalpels, one with German silver handle and one with nickel plated handle, were boiled twenty minutes in Lake Michigan water with 2 per cent. of green soap. No rust.

Experiment 14. Plate of aluminium boiled twenty minutes in pure Lake Michigan water. A thin, delicate tarnish appeared on the surface.

Experiment 15. Plate of aluminium boiled twenty minutes in Lake Michigan water containing 1 per cent. of sodium carbonate. Copiously covered with blackish rust.

Experiment 16. Several aluminium articles soaked

in solution of bichlorid of mercury, strength 1 to 2,000. Surfaces marred and injured by the bichlorid.

Experiment 17. Two steel plates were placed in a small covered dish of melted vaselin and set for twenty minutes in a bath of boiling water. Not a particle of rust resulted.

These experiments yield the following conclusions:

1. Hot distilled water and steam rapidly rust steel instruments.

2. One per cent. solutions of soap and sodium carbonate almost perfectly protect steel instruments, provided they are completely immersed in the fluid.

3. If instruments lie in a shallow boiling pan and are not fully covered with the protective fluid, and a cover or towel is laid over them, the portions projecting above the fluid will only get a steam bath and will rapidly rust. This is the accident which perplexes some surgeons, and leads them to think there is no uniformity about the action of protective fluids in preventing rust. The fluids themselves will not cause oxidation, but the steam rising from them will easily corrode steel.

There is one theoretical objection to the use of all these boiling fluids. Educated mechanical engineers say that the heat of boiling water somewhat impairs the temper of cutlery steel. This is no doubt true, yet they are not so badly softened as to prevent us from using them with good effect, and as the boiling seems to be a necessity, we have to put up with the slight injury done to their cutting efficiency.

2520 Prairie Avenue.

## SOCIETY PROCEEDINGS.

### Physicians' Club of Chicago.

*A regular meeting of the Club was held Monday evening, Nov. 30, 1896, at the Victoria Hotel.*

Dr. ARTHUR R. REYNOLDS in the Chair.

The subject for discussion was

THE WATER SUPPLY OF CHICAGO.

The Chairman in calling the meeting to order, said: Our subject tonight is "The Water Supply of Chicago." There is no subject in which the members of the medical profession of Chicago are so deeply interested, and there is perhaps no subject in which the taxpayers are so deeply interested, for it is true, or will be true at the close of this century, that the taxpayers of this community will have paid directly or indirectly to maintain the purity of its water supply $100,000,000 since the foundation of the city.

It has been said that each human being is worth to the State $5,000. Impure water has been credited with destroying a great many lives, and it has often occurred to me that in this public-health matter, looking toward the preservation and building up of the race, that in order to get the people to understand the importance of the subject, it is necessary for us to reduce the matter to dollars and cents. I can not tell you at this time how many lives have been sacrificed because of bad water and so can not compute the total cost. Our own water supply is sometimes good and sometimes bad. It is a matter of very great interest to Chicago to have the outside world think well of us, because this city is a commercial center and is well known all over the world. Indeed, when we were inviting the world to partake of our hospitality and to attend the Fair, it was one of the bugbears even beyond the Atlantic Ocean, that our water supply was bad and on this account a great many people that would otherwise have come to the Fair remained away. Medical journals across the Atlantic took the matter up and discussed our water supply with a great deal of interest, and pointed out the evils of our water system, while we ourselves had said nothing and have suffered in consequence. If our water is impure we should admit it at once, in order that proper measures may be taken to purify it. To start the ball rolling it gives me very great pleasure to introduce Prof. Carl S. Hallberg of the Chicago College of Pharmacy.

Prof. C. S. HALLBERG spoke to the text: "Water, air and cleanliness are the chief articles in my pharmacopeia." (Napoleon.) He said: As long as we have at the head of our municipal government men who know nothing about the importance of those matters for which they are engaged, taking care of the public health, we never can expect a better condition than we have at the present time. As for the subject of water; the newspapers have ridiculed the proposition of the Health Department to boil the water regularly every twenty-four or forty-eight hours, and one journal has even suggested that we get an automatic health department that would simply announce to the public every twenty-four hours, "boil the water," and that would be all that is necessary. However much we may ridicule the condition of the water in Chicago, anyone that has any knowledge of the service water in the large cities in this country, particularly in the East and Southeast, must agree with the statement that the water of Chicago, however bad, is better than it is in any other large city east of us. It is only in the cities west of us that the water supply is perhaps purer. To consider the best methods of purifying water is a large subject, and I shall only briefly touch upon it, for the reason that there are other gentlemen here who have made water supply a specialty. There are three methods of purifying water:

1. *Filtration.*—Filtration resolves itself into any process which will remove the finely suspended insoluble particles. We may carry that process to such an extent as to also remove whatever microörganisms or organic matter the water may contain. As to whether or not filtration will purify ordinary water, such as our Lake Michigan water, is doubtful. In the first place we must remember that the filtration from the service pipes, that is for domestic or culinary purposes in small quantities is one thing, while the attempt to filter all the water which goes through the service pipes is another thing. It is quite possible to purify water if we attempt to do so in small quantities for domestic purposes, provided we take extreme care, giving it constant and unremitting attention. Filtration, as you doubtless know, is dependent upon the attraction that solid matter has for other solid matter. When we pass a liquid charged with more or less solid matter through a porous solid, such as animal charcoal, which is a mass of minute pores, by capillary attraction the solids, and particularly in this case, organic matter, are attracted and retained in the pores, while the clear water is allowed to pass through. For small operations we might choose various media through which to pass water which will not only rid it of the grosser impurities that it may contain, but will also carry off the microörganisms themselves. But we must remember that just as soon as this particular medium becomes charged to saturation with the insoluble matter, or with microörganisms, from that time on the process can be no more effective, and that is an objection to all forms of filtration of whatever kind; in filters made from sand, charcoal or silicious matter in any form, or burnt laolin, made into cylinders and the water passed through by pressure as in the Chamberlin-Pasteur period, and then their usefulness is at an end. Then, in many instances, the filters may require to be regenerated, burnt out, when they will again be free from organic matter and effective and be used again. In a larger way it is doubtful whether or not, for a city like Chicago, water can be purified by filtration. I might refer here to the conclusions based upon filtering apparatus used in three or four of the largest German rivers, because we have no details from any others, such as the Elbe, Oder, Neckar and Spree. The various cities situated on these rivers, such as Breslau, Berlin, Altona and Stüttgart, have filtering apparatus attached for purifying the water. But it is found by referring to the standard work of Koenig, that there are more impurities in the water served to those cities on the German rivers that have filtering apparatus attached than any other cities which do not have any filtering apparatus. This may not be conclusive testimony, but The Waterworks Technical Society of Germany a couple of years ago, after investigating the matter, reported that it must be remembered that the microörganisms in a filter settle to the bottom of a filter. The manner in which these filters are constructed is to have a depth of from five to six feet of various fineness of sand, gravel and stones. For example, beginning with a layer of fine sand, then coarser sand, then gravel and coarser gravel on top of that and finally pebbles. A bed like that, 300 meters square, representing 90,000 square meters area, would filter about one hundred million gallons of water every twenty-four hours. The bacteria are found to accumulate and to grow under the bed of the filter. In the beginning the water runs through in an impure condition, but after a while a sediment forms and a rather thick impervious coating over the porous bed, which retards mechanical impurities and lessens largely the number of bacteria. However, the question has yet to be solved whether or not a

filtering apparatus, constructed in this manner, is sufficient to purify the water on so enormous a scale as would be required for a large city like Chicago.

It is possible by the use of upward filtration that the growth of bacteria might be prevented. This is a phase of the subject which has as yet not been fully investigated.

2. *Distillation.*—Another method of purifying water consists in distillation. In distillation, if proper care be taken to reject portions which are loaded with ammonia and the various gases which the water contains, and in not carrying distillation beyond a certain limit, we can obtain under proper condensation absolutely pure and sterile water. Distilled water does not keep unless exposed to air, when it may be protected against infection from bacteria by stopping the container with absorbent cotton. Distilled water is not suitable for potable purposes, not only from the lack of the gases but of the salts which it is necessary to have in the water in order to make it palatable, an aid for digestion, and to allay thirst. If distilled water is aerated and the gases are supplied we can secure palatability to a very great extent, but such will not keep as well as water which has not been sterilized or distilled, which has certain salts in it, particularly nitrates which prevent the accumulation and growth of bacteria. For that reason we believe the only practical method is that of precipitation.

3. *Precipitation.*—The method of precipitation for the purification of water seems to be upon the whole, wherever the quantity required is not too great, the most satisfactory. The ordinary impurities in water are alkalin salts, calcium, sodium, magnesium, and those derivable from the organic matter directly or indirectly, such as ammonia and its compounds. There are several substances which upon the addition to water are split up and form new compounds. Of these are the sulphate of aluminum, and the double sulphate of aluminum and potassium. When alum in solution is aded to water, according to the proportion of impurity in the water to be gotten rid of, the aluminum sulphate is split up and forms aluminum hydrate. The sulphuric acid radical which is eliminated combines with the calcium and forms the sulphate of calcium or gypsum. Both of these substances are as insoluble as any substances we have. They are heavy. They go down. The aluminum hydrate spreads as a flocculent precipitate over the surface of the water and as it goes down it carries both the finely suspended and organic impurities with it. After the water has settled for twenty-four hours we may obtain the purified water by decantation or by syphoning it. Filtration perhaps would be most reliable in many instances. It is a fairly practicable, inexpensive and convenient process. The alum must be the potassia-alum; ammonia-alum will not answer the purpose. The quantity of alum required is from 5 to 10 grains to one gallon of water; ordinarily Chicago water requires 8 grains to the gallon. By this process you purify the water and leave it otherwise as it is. You do not change the water from its natural condition, except that you eliminate those impurities which are undesirable, and I believe for operations in small cities it is the most feasible, practical method.

There are a great many substances used for precipitants, and there are regenerative processes. Calcium permanganate can be used as a precipitant, and with it gases can be removed. We have also the dried basic phosphate of sodium for this purpose, the precipitate forming the phosphate of calcium, which can be collected and used for fertilizing purposes. I believe there is a scheme on foot abroad where the phosphate of sodium is used and the residue sold for the purpose of fertilization.

There is a system of filtration through pumice stone which has been saturated with ferric hydrate. The water is allowed to pass through and the ferric hydrate combines with the impurities and renders them insoluble. Neither the medicinal solution nor the tincture will answer. The solution of ferric chlorid, on account of containing free acid, added to water forms ferric hydrate which causes a flocculent precipitate to spread over the water and carries the impurities with it.

We are inclined to think that precipitation in conjunction with filtration is the most feasible method for purifying water that is used for domestic purposes and in public institutions. We admit, however, that we have never given these waters any biologic examination because we do not think it is necessary; I believe that when we can determine by chemic methods that water is absolutely pure, it is unnecessary to subject it to a biologic test. A biologic test does not always indicate the purity of water. Water should be examined chemically first, and then as a corroborative test it should be examined biologically.

In conclusion, Mr. Chairman, I wish to say that not until some method is devised whereby that putrid mass of filth which floats into the river from the abattoirs is stopped or modified, will Chicago ever have good water.

F. W. REILLY, M.D., Assistant Commissioner of Health, read a paper on

RELATION OF THE MEDICAL PROFESSION TO THE WATER SUPPLY OF CHICAGO.

The history of the efforts to secure a pure water supply for Chicago is inseparably connected with that of the medical profession of the city. Forty-seven years ago Dr. N. S. Davis arrived in Chicago in the height of the cholera epidemic of 1849. Before the epidemic was over he had traced the relationship between the greater incidence of the disease in certain localities and the use of water from surface wells, and at once began an agitation for pure water from the lake. During the summer of 1850 he delivered a course of lectures on the sanitary conditions of the city and pointed out the means for their improvement. The plans he then suggested for a pure water supply and for its necessary complement—the proper disposal of the sewage of the city—are the basis of all that was done toward these ends during the subsequent forty years. One immediate result was the passage of an act, Feb. 15, 1851, incorporating the Chicago Hydraulic Company, the foundation of our present system of water supply.

Only the merest mention may be made of those who followed the initiative of Dr. Davis and persistently pointed out the evil effects of impure water and urged measures for preventing the pollution of our source of supply. The roll would include the names of almost every man prominent in the profession in the early days, Brainard, Egan, McVickar, Boone, Paoli, Ross, Lyman, Holmes, Byford, Hollister and their colleagues, among whom may be especially noted Dr. James Van Zandt Blaney, who, while the writer was an assistant in his laboratory in "Old Rush" in 1855-56, made the first chemic analysis of Lake Michigan water; Dr. Hosmer Allen Johnson, subsequently a sanitarian of national reputation, and Dr. Edmund Andrews, whose report on the erysipelas epidemic of 1863 was a scathing indictment of the municipal indifference which had allowed the river to become an open cesspool, with here and there an independent pollution, which he describes with grim humor, as answering "every purpose for the increase of medical practice in general and of erysipelas in particular."

To no other member of the medical profession, however, if to any other citizen, does Chicago owe so much in this connection as to the late Dr. John H. Rauch. Indefatigable as were his labors in the cause of medical education and far-reaching as were their results during his lifetime, his efforts toward the solution of the sanitary problems of Chicago were of even greater and more direct importance to the prosperity and the health of this community. The work that he did lives after him in the parks and boulevards of the city; a direct result of his monograph on "Public Parks; Their Effects upon the Moral, Physical and Sanitary Conditions of the Inhabitants of Large Cities, with Especial Reference to Chicago." It lives after him in the suburban cemeteries which now receive the city's dead, without offense or menace to the living; the result of a paper read before the Chicago Historical Society in 1858, entitled "Intramural Interments in Populous Cities and Their Influence upon Health and Epidemics." His work lives after him in the present drainage and sewerage system, which he so persistently urged, and concerning which, in his report, as sanitary superintendent, to the Chicago Board of Health in 1869, when the average death rate for twenty-five years had been over thirty in the thousand—he wrote as follows:

> From the results of drainage and other sanitary measures carried on in this city, it may be inferred that the judicious expenditure of money for sanitary purposes is a sound maxim of municipal economy, and from past experience I am satisfied that the mean annual death rate can be reduced to 17 per 1,000 by continuing in force the present sanitary and drainage regulations, thereby making Chicago one of the healthiest cities in the world.

In his presidential address before the American Public Health Association he cited this prediction, together with other passages from his reports and papers, with the following comment:

> I introduce these quotations simply to show that sanitary science has made sufficient progress at the present time to admit of the supreme test which science falsely so-called can never endure—that of verification by subsequent experience.

Dr. Rauch fortunately lived to see the verification of his prophecy "by subsequent experience." The year before his death, in March, 1894, the mortality rate of the city was only 16.9 per thousand of its population, a fraction less than that which he had asserted, twenty-four years before, was attainable if the plans originally formulated by Dr. Davis in 1850 should continue to be carried out.

And Rauch, too, was a prophet not without honor—save among his own people!

*Basis of the sanitary waterway and drainage channel.*—He lived, however, to see also the fruition of his efforts for the protection of the water supply of the city in the advanced

stage of work on the great sanitary waterway and drainage channel. In his annual report for 1869, he foreshadowed, in a general way, the plan now in progress for the ultimate disposal of Chicago sewage and consequent protection of the water supply, and from that time until work on the sanitary waterway was actually begun he continued to accumulate facts and present arguments, which were finally successful.

Probably no other one demonstration had more weight in determining the adoption of the present plan than that developed in the study and collation of the results of Prof. J. H. Long's analyses of the sewage contents of the Illinois and Michigan Canal and of the waters of the Illinois River as far south as Peoria, made in the summer of 1886. These analyses were part of a plan projected by Dr. Rauch, and carried out under the direct supervision of the writer, for an investigation of the water supplies of the State, with especial reference to the progressive decomposition of sewage in running streams, first between Chicago and St. Louis and subsequently in other Illinois water courses.

The collation of Professor Long's analyses between Bridgeport and Peoria enabled me to show that more than one half the sewage pollution of the canal disappeared before reaching Lockport; nearly one-third of the remainder was lost in the next four miles, or 33 miles from Bridgeport; while at Channahon, 48 miles from the city, no trace of sewage was detected. These results were so unlooked for that Dr. Rauch hesitated to accept them. Water analysts had asserted that the self-purification of a polluted stream was impossible—as one phrased it, "no river in the world is long enough to purify itself after it has once been contaminated with organic matter." In his article on "Water," in the Reference Hand Book of the Medical Sciences (Vol. vii, p. 714), that distinguished authority, Surgeon Charles Smart, U. S. A.—with whom the writer was associated, together with Deputy Surgeon-General John S. Billings, U. S. A. and Col. George E. Waring, Jr., in the sanitary regeneration of the city of Memphis after the terrible yellow-fever summer of 1878—makes the following comment touching this matter:

"These statements would be of immense importance were they sustained by collateral evidence; but, unfortunately, those analysts who have had much practical experience in following the track of sewage in its passage down stream, will recognize in these results: 1. The analysis of a fresh and turbid sewage at the starting point, the solid particles of organic matter giving a high rate of impurity; 2, the analysis of a partly sedimented sewage as those particles disappear from the water; and, 3, the dilution effected by the Desplaines river."

To this I felt constrained to make the following reply in the "Preliminary Report to the Illinois State Board of Health on the Water Supplies of Illinois and the Pollution of its Streams," April, 1889:

"For the benefit of those 'analysts who have had much practical experience in following the track of sewage in its passage down stream' it should be stated that: 1. The analysis itself, showing 12.6 parts of free ammonia per million, is that of anything but 'a fresh and turbid sewage, at the starting point;' on the contrary, it is a sewage in an advanced stage of decomposition. 2. 'Sedimentation' in a current with the velocity of that in the Illinois and Michigan Canal is a physical impossibility, and this entirely apart from the influence of the passage of boats. 3. It is expressly stated in the text quoted by Dr. Smart that there was 'no dilution of the contents of the canal,' which contents were the sole subject of the various analyses at Bridgeport, Lockport and Joliet; as a matter of fact, the Desplaines river above the point of junction with the canal had ceased to exist as a watercourse during the period of observation—which was one of unprecedented drought—and the contents of the canal were undiluted from any source after leaving Bridgeport."

The demonstration and its deductions were of such obvious—such "immense importance," to borrow Dr. Smart's phrase, that the analyses were repeated in the winter of 1886-7, again in the summer of 1888 and still again in the spring of 1889, with substantially similar results in every case.

In 1892 Professor Pettenkofer caused a similar investigation to be made of the River Isar, which receives the sewage of Munich. Within a mile below the point at which the Isar receives the Munich sewage the *beggiotoa*, or sewage fungus, was found growing in abundance; it was still found at Ismaning, between seven and eight miles below; but the last traces were found at Garching, ten miles below Munich. After a ten or twelve miles' flow the Isar so far purifies itself from sewage that its waters no longer support the *beggiotoa*. The chemic analyses gave similar results, while Pettenkofer himself reports that he found 198,000 bacteria to the cubic centimeter at the mouth of the sewer and only 3,600 at Freising, twenty miles below. He distinctly asserts that sewage is decomposed in running streams and is rendered harmless in a few miles' flow.

It may be added that bacteriologic investigation fully supports Professor Long's chemic analyses and the combined chemic and bacteriologic examinations of Professor Pettenkofer. Dr. Adolph Gehrmann, Director of the City Laboratory, who has probably done as much practical work in water bacteriology as any other man in the United States, made a special study of these waters from the south branch of the Chicago River to a point just below Peoria, during September, 1894. One of the chief objects of his study was the typho-coli group of bacilli. The difficulty thus far unsurmounted of identifying the Eberth bacillus in the water supply of any large city lends especial interest to this group. During 1892 Dr. Gehrmann isolated seven organisms resembling the *B. typhosus*, but each gave some variation from the typical, either in growth or on potato or as to gas production. As a result of this study and of the work in 1894, under the direction of your Chairman, Dr. Reynolds, then Commissioner of Health, Dr. Gehrmann found that, while the bacilli of this group will live in sewage contaminated water a variable time, the evidence is that they do not tend to multiply in such water but disappear after a longer or shorter period. He found them in the sewage-contents of the Illinois and Michigan canal and in the Illinois river at every point between Chicago and Peru. At Hennepin they had entirely disappeared and were not again detected anywhere below that place until after Peoria was reached. They were not present just above the city, but were found in abundance just below, after the river had received the Peoria drainage and sewage. At Lockport the specimens showed 930,000 bacteria, including the B. coli communis, in each cubic centimeter; at Henry the number had diminished to 5,500 per cubic centimeter, with none of the coli-typhoid group present.

In short, it may be accepted as an axiom that running streams tend to purify themselves; they always have done so and will continue to do so when not too highly charged with organic matter; that is, charged beyond the powers of the bio-chemic process continually operating in nature—the action of sunlight and oxygen and of the inconceivable myriads of microörganisms that live on organic matter, break it down and finally leave it inert and innocuous. This might have been argued *a priori*, but for the dogmas of the earlier water analysts who for years based all their conclusions on the results of chemic determinations to the exclusion of the bacteriologic.

A prolonged study of the composition of Chicago sewage finally led to the conclusion that a dilution of 20 to 1, in a stream with a velocity of one and a half miles an hour, would be sufficient to cause a disappearance of pollution in a flow of less than twenty miles. It is upon this theory that the dimensions of the drainage channel are based.

*Unfounded fears of St. Louis and the Valley.*—It has been recently announced from St. Louis that the Eberth bacillus has been found in water taken from the mouth of the Illinois River at Grafton, and that it was positively identified—probably by a tag or label—as a genuine Chicago product. Our professional brethren in that city who are moving heaven and earth, including the Federal Government, to stop our drainage canal lest the Chicago bacteria affect those which they themselves propagate, and our colleagues in the Illinois Valley, who are concerned lest the Illinois River be affected as a source of water supply, should pluck up heart of grace from the above cited demonstrations.

The contribution of the Illinois River to the drinking supply of St. Louis via the Mississippi River will, after the drainage canal is in operation, be incomparably better than it is now. As for the Illinois itself, its waters are naturally not potable and have long since been abandoned by many of the valley towns as a source of water supply. Its sources are largely in marshy areas, whence it becomes highly charged with organic matter; it is malarious, readily stagnates, and has scarce enough free oxygen to support fish life. With the contribution, through the drainage canal, of from 300,000 to 600,000 cubic feet of water per minute, chiefly from Lake Michigan, with its excess of oxygen, not only the navigable and economic, but the sanitary conditions of the river will be immensely improved. Mr. L. E. Cooley, who has already addressed the Club on this subject, recently suggested to the writer that the profitable disposal of sewage may, after all, lie in this direction. Fish will not live in the Illinois above Morris, sixty miles from Chicago, nor for twenty to thirty miles below Peoria—beyond which distance the stream purifies itself so that fish are again found. U. S. Commissioner Bartlett reports that in 1893 11,000,000 pounds of fish were taken from the other stretches of the river—a more profit-

able crop, as Mr. Cooley puts it, than any garnered from the prairies of the State, acre for acre.

Section 20 of the Sanitary District Act reads as follows:

"Any channel or outlet constructed under the provisions of this act, which shall cause the discharge of sewage into or through any river or stream of water beyond or without the limits of the district constructing the same, shall be of sufficient size and capacity to produce a continuous flow of water of at least two hundred (200) cubic feet per minute for each one thousand (1,000) of the population of the district drained thereby, and the same shall be kept and maintained of such and in such condition that the water thereof shall be neither offensive or injurious to the health of any of the people of this State, and before any sewage shall be discharged into such channel or outlet, all garbage, dead animals, and parts thereof, and other solids shall be taken therefrom."

It will be noted that the degree of dilution shall not be *less* than 200 cubic feet per minute for every 1,000 inhabitants, and it *must* be as much more as is found necessary to keep the channel in a condition "neither offensive nor injurious to the health of the people of the State." Furthermore all solid animal or vegetable matter shall be taken out of the sewage before it is discharged into the channel. With these conditions maintained it is believed that fish will live in its waters throughout, except at sewer mouths or in the vicinity of special pollution. It is certain that they will be restored to the full length of the Illinois River, to convert the wastes and refuse of every town upon its banks into a palatable and profitable food crop, thus furnishing an ideal solution of one of Chicago's sanitary problems—the prompt and inoffensive disposal of its sewage and the consequent protection of its water supply.

Certain squeamish individuals, with highly imaginative stomachs, have objected to this proposition as nauseating. But wherein does the conversion of waste organic matter into finny food differ from its conversion into vegetable food? These very persons are among those who strenuously and obstructively labored for the disposal of our sewage by broad irrigation and sewage farming. Yet plant life fed upon sewage is not less a scavenger of earth than is fish life of water.

*Alternate plans for the disposal of Chicago sewage.*—I was asked to say something tonight about the alternate plans for the protection of the water supply from sewage contamination and about underground water supplies.

Only two other plans have received serious consideration—one for the construction of a huge tunnel out into Lake Michigan off Hyde Park, into which all the sewage of the city should be gathered and discharged on the bottom of the lake. This monstrus proposition, it is hardly necessary to say, was *not* conceived by a Chicago physician. It was seriously advocated, however, by a prominent Eastern engineer who was imported to tell us what to do to be saved. Thousands of dollars were spent in attempts to show its feasibility and it was finally abandoned only when its minimum cost was seen to be at least $37,000,000, with an annual expense of $2,500,000 more for maintenance. Its monstrous character will be better appreciated when it is known that the relatively few lake-emptying sewers now discharge an equivalent of 1,500 tons of solid organic matter into the lake every year, and this has already covered the lake bottom with a bed of filth to an undetermined distance from the shore—analyses made last month, October, show traces of its pollution twelve miles east of the Chicago Avenue pumping station.

The other project was for land disposal of the sewage by filtration and irrigation. This was also abandoned after prolonged study and expensive investigation. Its minimum cost was estimated at $58,000,000, with fixed charges of $3,000,000 per annum, and it would further have required the consent of the State of Indiana, since the nearest suitable body of land extends into that State. The Commission, appointed in 1886, spent a year's time and between $70,000 and $80,000, chiefly in efforts to find arguments for the recommendation of one or the other of these projects, but was finally and reluctantly compelled to take up the plan already well digested and generally approved by Chicago physicians.

Such adverse criticism of this plan as is still met with is generally found, on examination, to be due to misconception of its character and purpose. Its essential purpose is to keep Chicago's sewage from polluting Chicago's twenty-odd miles of lake frontage, and the lake itself, from which its water supply is drawn. This is a sanitary necessity, even though every drop of Chicago's drinking water should be filtered or otherwise purified—as it will have to be unless relief is speedily afforded through this channel and its essential complement, the intercepting sewers. In character, it is a new tributary to the Illinois River, with a less degree of organic impurity than any other of its tributaries, and destined to materially improve the sanitary conditions of the entire Illinois Valley—the "great malaria preserve" of the State, as it has been called.

*Chicago's underground water supplies.*—There is not so much to be said tonight concerning the underground water supplies as there seemed to be when the subject was first talked over with your Chairman, who was, as he expressed it, "fascinated with the idea."

In the winter of 1885-86 I thought I had made a very valuable discovery. Mr. Cooley, Mr. Ossian Githrie and myself, as a sub-committee of the Main Drainage and Water Supply Committee of the Citizens' Association, appointed to investigate and report upon measures of relief for conditions which were even worse than the present, had submitted in September, 1885, our joint report embodying the three essential features of the project now being prosecuted. We were, however, still independently pursuing our investigations in search of pure water.

Late in the fall of the year 1885, my attention was attracted to the wells sunk into the fissured Niagara limestone which underlies the city, covered by a blanket of impermeable blue clay, and the study resulted in the publication of a series of articles, the first of which appeared in the *Morning News* of Jan. 27, 1886.

A recently published communication from Gen. Sooy Smith, one of the newly appointed Water Commission, in which he now advocates the same views, led me to look into the matter again, and I have materially modified the enthusiasm with which I once urged the substitution of vertical tunnels, a few hundred feet deep into the unpollutable underground supplies, for the horizontal tunnels of two to four miles long out into the lake.

Briefly stated, there are three water-bearing strata under Chicago; first, the fissured Niagara limestone, reached at a little over 100 feet from the surface and having a depth of about 700 feet; second, the St. Peter's sandstone, immediately beneath, with a thickness of about 200 feet; and third, the Potsdam formation, separated from the St. Peter's by a non-water-bearing stratum some 300 feet thick. Wells sunk into the Niagara now furnish about 20,000,000 gallons a day, and as much more is obtained from the Potsdam at a depth of more than 1,200 feet. The maximum capacity is, however, probably already reached. The first Potsdam or artesian wells flowed above the surface, but every additional well now affects the level of the existing wells, and all now require pumping; this is also true of the shallow or Niagara wells. There still remains the St. Peter's sandstone, which is water-bearing throughout its whole mass, but not, in the opinion of Mr. Thos. T. Johnstone, Engineer of the Sanitary District, in a sufficient degree to render it useful as a source of supply for a large city. Mr. Johnstone, to whom I am indebted for this recent information, suggests, however, that perhaps the St. Peter's might be fed artificially from Lake Michigan by driving shafts into it from the bottom of the lake. It is also possible that the Potsdam would yield more abundantly from a greater depth, though Mr. Johnston tells me that below 2,000 feet the water is too rich in salt to be used for drinking purposes, whilst as to the fissured Niagara he says that "sufficiently extensive explorations only can determine finally whether natural tunnels are available; but the general facts known are not sufficiently encouraging to lead to a belief that useful results would follow."

*Unappreciated public services of the medical profession.*—I will detain the club only a moment more. The Relation of the Medical Profession to the Water Supply of Chicago is typical of its relations to every effort for the betterment of the conditions of life in this community. And these relations are at last becoming recognized—though slowly—by the community, as shown by the following tribute to the profession from a local historian, himself a non-professional. Prefacing a chapter on the medical history of Chicago, he says:

"When negligence permitted the condition of the city to become unhealthy in the extreme, an invitation to epidemics, the physicians persistently sounded the alarm that ultimately caused the citizens to demand of the authorities purification and the establishment of sanitary laws and officials. The system of sewerage adopted by the city was substantially a mode suggested by a physician. The method of drainage was that promulgated by a physician. And when the tardy measures taken to cleanse the city had proven utterly ineffectual and the cholera appeared, those who had so persistently advocated precautionary measures demonstrated that they knew not only how to warn against a foe, but also how to fight it; and with unremitting zeal, with unswerving fidelity to the afflicted and with the most complete self-abnegation, the physicians of Chicago cared for the sufferers. Of all the bright pages of Chicago's history there is none that glow with brighter

luster than that whereon are emblazoned the names of those physicians whose assiduity in attendance upon cholera-stricken patients caused them to forfeit their own lives."

To this it may be added that the medical profession is the only one of a secular nature whose members persistently labor to reduce the demand for their own services. All sanitary progress, every advance in the field of preventive medicine by which the causes of disease are removed or disarmed, by which, in the language of Edmund Parkes, "growth is rendered more perfect, decay less rapid, life more vigorous, death more remote," and therefore and perforce, the field of curative medicine is abridged and the remunerative practice of the physician grows less and less—is the result of the physician himself.

Speaking of the development of the science and art of preventive medicine, Sir Benjamin Ward Richardson, just deceased, says: "It is not a science, it is not an art separated necessarily or properly from so-called curative medicine. On the contrary, the study of prevention and of cure proceed well together, and he is the most perfect sanitarian and he is the most accomplished and useful physician who knows most both of the prevention of disease and of the nature and treatment of disease." This lofty sentiment we openly and sincerely applaud, while a still small voice in the privacy of home or office confronted with the monthly bills, asks who pays and who gets paid for preventing disease, from the treatment of which alone are fees now derived?

This is, of course, a very sordid and ignoble query, but sooner or later it must be answered. You, gentlemen of the Physicians' Club, assembled tonight to show your interest in the subject of a pure water supply for Chicago—whereby you won't be bothered with treating typhoid fever and other remunerative lingering intestinal diseases—may take this proposition home for futher consideration: Preventive medicine and curative medicine are logically antagonistic so long as the public pays only for curing disease. When the long-eared animal comprehends that it is more economical to pay for its prevention than its cure the physician will be properly appreciated and properly compensated for services which he now not merely renders gratis, but to the detriment of his only recognized sources of income.

Dr. ADOLPH GEHRMANN followed with remarks upon

THE LOCAL AND DOMESTIC PURIFICATION OF WATER.

He said: I beg leave to make one or two remarks concerning the reasons why the quality of the water supply of the city of Chicago changes so often as it does, before saying anything as to the different methods of local purification. We have twenty seven sewers and two rivers emptying directly onto the lake front. The Calumet River always flows into the lake; the Chicago River usually flows in the direction of Bridgeport, but oftentimes its flow is toward the lake. When such conditions are present as will carry sewage into the lake, or in an unusual quantity, the water supply becomes bad. If we have a dry season the sewage which is poured into the lake is mostly cared for near shore by the natural agencies of purification and the absorbed oxygen which is in the lake water. At such times the current of the Chicago River is in the direction of Bridgeport.

A condition which will sometimes aid in bringing about local conditions of impurity is the direction of the wind. A strong westerly wind will lower the level of the lake to a considerable degree and the rivers will flow strongly toward it. Surface water will be blown out from shore, as any one may see at 35th or 22nd street, where sewers discharge. Here a grayish streak extending out from the mouth of the sewer will be seen. Sometimes it can be seen for a distance of two miles. It is distinct and separated from the rest of the water and is produced by the wind not ruffling the greasy sewer water. The grayish streak passes in the direction in which the wind is blowing. If we have a strong southwest wind, contamination of the north cribs is more marked. If we have, on the other hand, north winds, and especially northeast winds, which blow the water south along the lake shore, we have contamination of the south cribs. When we have a period of heavy rain combined with westerly winds, sewage will flow into the lake to an unlimited extent and the most serious contamination results. It varies with the conditions. At such times we have taken samples out as far as twelve miles and found no marked improvement, except in the last two samples in one series and in the last sample in another series.

As far as the local purification of water is concerned, it is simply an expedient wherever it is undertaken. To me it seems about like this: Some local method is used when the citizen himself believes he must have some method of purifying his water supply. But if all the people in a locality believe that the water is bad they immediately set about to remove or avoid the general contamination. If the water supply of a town is admittedly bad it behooves the people, in their households and other places, to resort to whatever means of purification they can have until a general pure supply of water is brought to them. We can place the various methods of purifying water under headings according to their value and their ease of application.

The first is boiling the water. This is by all means the simplest, and as far as disease-producing germs are concerned, especially those of typhoid fever, it is the best. The only great obstacle to it is the length of time which the water requires to be boiled. The period for boiling should be thirty minutes, but the chances are people often desire water when the supply is exhausted and will not wait the time of boiling a new quantity. Then the matter of cooling water after it is boiled is another consideration. Distillation does give us perfectly pure water. But owing to the absence of salts the water is not as good for use. A pinch of salt may be added to it and to some extent this fault can be overcome.

In regard to the question of purification by filtering and by boiling. When one comes to figure the expense for a year, and the amount of gas required daily in a household, or the quantity of coal used, to boil or distill a certain quantity of water, he will find that it is quite an item of expense, equal to the cost of a filter. A friend said to me some time ago, "How is it you are in collusion with the gas and coal companies!" I was astounded. I could not see what he meant at first. He said, "Why you are instructing the public to boil their water, using gas or coal."

The matter of local filtration is one of considerable interest and one that has a great many sides to it because of the great number and variety of appliances which have been suggested for the purpose. We may view the question from two aspects: 1, the purification of water from a sanitary standpoint; 2, the purification of water simply by removing the bacteria which are contained in it.

With reference to purification by filtration from a sanitary standpoint, when we take into consideration the storage of the water, most of the water delivered by filters will be ruled out, because the water becomes contaminated if it is in storage tanks, the number of bacteria will increase, and on account of the number of bacteria the water would be classed as not being potable or sanitary.

As regards filtration for bacteria, they will be removed by any material which is dense enough or has pores smaller than the diameter or size of the bacteria. However there are two facts in regard to the removal of bacteria by a filtering medium. One is the direct removal which may take place by a good many substances, and the other is the "growing through" of the bacteria through the filter. If a filter has been used a length of time and bacteria are crowded into the pores, they gradually grow along these spaces; that is to say, the bacteria adjust themselves to the spaces and after a time appear on the filtered water side of the medium. The growing through depends upon the degree of organic matter that is present and the temperature at which the filter is kept. If there is less food, and the temperature is lower, the filter can be used with less danger of this than if the reverse is the case. Every filter should have a ready means of cleansing the medium for filtration. A filter which is new will work satisfactorily; but after it has been used a short time it will be found that the condition is gradually one of increasing impurity in the water delivered from it. The organic constituents increase in the water and if the filter has been used a considerable time it will be found that bacteria will grow through and appear in the filtered water. Self-cleaning filters are of no value. The medium is to be one which can be renewed entirely, or which can be taken out and regenerated by some method of dry heat or steam, or by some chemical process.

Methods of precipitation, as Professor Hallberg has said, are of value in some instances. I can simply mention two other procedures that have been advocated to a considerable extent, not, however, for the purpose of precipitation, and dragging down the bacteria, but for their direct action upon the bacteria. Fluorid salts are known to have considerable germicidal action and are recommended for use in water in one in ten thousand strength, but I have found they are not efficient except when given in the proportion of one in one thousand, so that the fluorids are of no value at all unless given in proper strength. One part per thousand is not poisonous to animal tissue.

The use of the coal tar preparations, such as saccharin, have been recommended for the same purpose. The saccharin gives an unusual taste to the water which is not agreeable and it does not act as efficiently as has been claimed for it. However, I have not experimented to any extent with this substance

Precipitation by the use of alum or other substances which brings about a flocculent precipitate and causes settling is a very good means of purification, but it is difficult to carry out the method. The purification is always left to some person about the household to manage and the amount of precipitant which is added, or the method of application of the chemical, or the means of drawing off, is not completely and accurately followed out, so that the results are not surely as good as they should be. The same is true of any method of filtration. The filter is usually left to be managed by the cook or some one about the kitchen. The tube may be clean to start with, and the apparatus filtering properly, but some part of the apparatus may become loose; some unfiltered water may escape through the filter. The filter may be properly constructed, but when the filtering medium is replaced in the filter some water may overflow into the chamber for the filtered water, or a crack may be produced that is unnoticed at the time, consequently there will be an increased amount of filtration brought about by such an accident. This would indeed be looked upon by the cook as being a great advantage on account of the filter acting a little more quickly. She would consider that the filter had been very effectually cleaned. It is as necessary to have expert care for household filters as it is for large filtering plants.

I will simply say again that the methods that are used for local purification of water are excipients which are to be used simply for emergencies. What we all need is a pure water supply, and we should attain it by whatever means and whatever cost we can. We should, however, take our neighbors into consideration and to some extent, at least, do what we can toward avoiding any danger to them.

Mr. CHARLES E. KREMER also discussed the subject.

The Chairman then introduced Mr. JEWELL, who said: The filtration of water in all of its forms is a subject to which I have given special study and inasmuch as the water supply of Chicago is giving so much trouble now, if some comparison with the work which is being done in other cities will be acceptable, I will be pleased to tell you briefly what is going on in other cities in this country. The City of Cincinnati has appropriated $6,000 000 by authority of the legislature to improve its water supply.

The City of Philadelphia has been discussing the question of filtering its water supply for the last three years, and it is only about three weeks ago that an appropriation was made by the Council of $3,000,000 to be spent in filtering the water supply of that city. They have discussed the subject of going out of neighboring water sheds to get water, and of sinking wells and of resorting to various other methods, but after investigating the subject very carefully during the last three years, they have decided to filter the water as the most practical and best means.

The City of Scranton, Pa., has just passed an ordinance to construct a filtering plant. The City of St. Louis, Mo., had a bill up for second reading before the Council at its last meeting having for its object the appropriation of $3,500,000 to filter its water supply. About five million of dollars a number of years ago was appropriated to improve the quality of the water. The settling tanks in the new pumping station have been in use for almost two years, but are unsatisfactory.

The City of Louisville is also going to filter its water next year. A filter has been located at the pumping station of the Louisville water works, to be operated for one year, and at a cost within the limits of acceptability. It has a capacity of 250,000 gallons a day. The filter is run day and night.

There are practically two methods of filtration on a large scale. One is known as the bed system, the other as the mechanical system of filtration. The bed system is the one to which Professor Hallberg referred as being in operation in Europe, and is unsatisfactory. The American system is the mechanical system of filtration, and American filters are even being sent abroad. They are in operation in France and Germany.

There is a filter in operation at Wilkesbarre, Pa., with a capacity of 15,000,000 gallons of water a day, and also one at Elmira, N. Y., with a capacity of 6,000,000 gallons per day.

Dr. NICHOLAS SENN—The subject under discussion tonight is so foreign to my line of thought, that I shall occupy your time but for a moment. There seems to be a wrong idea among the public, and to a certain extent among the profession, in reference to the disease-producing qualities of germs which contaminate pure water. Some of the remarks made here this evening seem to point in the same direction. I was very much astonished when Dr. Reilly referred to an epidemic of erysipelas that prevailed here, and which was attributed by no less an authority than Professor Andrews to impure water. We all know, from bacteriologic research, that it is absolutely safe to drink pure cultures of the microbe of erysipelas without any danger of contracting the disease, because the microbe of erysipelas can only exercise its pathogenic properties when introduced into the vascular tissue of the body. It is not the pathogenic microbes which infest the intestinal canal that are always dangerous, but the microbes that are produced by such diseases as cholera and typhoid. The only disease that can be traced in this city to impurity of the Lake Michigan water would be, if any, typhoid fever, because we know all other microbes with which we have to contend here do not produce intestinal infection. I have been very much interested indeed by the speeches that have been made this evening. I have learned a great deal about water. I am somewhat disappointed in not having heard, however, so far as Chicago is concerned, more said about the prevention of the contamination of our water than the purification of it. Our citizens are paying water taxes and are supposed to receive pure water, and I believe if disease could be traced to impure water furnished by the city, the city could be held responsible. The completion of the drainage canal will, I trust, do away with further contamination of our water supply.

Dr. CLARK W. HAWLEY—I have had an instance of pure water contamination come to my notice within a week in the city of Aurora. They had an epidemic of typhoid fever there this year. They have been tapping the same vein as is found here for artesian water, and when the season is favorable they have plenty of such water. Every case of typhoid fever they have had within the last six months has occurred among people who drink nothing but well water, and not a single case of the disease has occurred among families who use the artesian water. There can hardly be a better demonstration of the necessity of pure water. One of the physicians of Aurora told me this within a week, that "Every case so far has been fully investigated, and all of the cases of typhoid that have occurred have been using water from wells." The cities of Joliet, Ottawa and Aurora, and those along the Illinois river are afraid of being contaminated by the sewage system that is going to take place and they must begin to supply themselves with water from other sources than those they at present have.

I was quite surprised to hear that as the water went down the Michigan Canal it improved, or it was pure at eight or twelve miles out. If any of those who made the report had lived as near to the canal at a hundred miles out as I have, I do not know what they would think. I know the water at Ottawa is an abomination, and I do not see how the water can be made better when a canal emits such a stench as they get there. Of course, I am not disputing the facts of chemic analysis. I am speaking from nose experience only, because I have lived in that neighborhood and know the canal there is foul indeed. The reason I do not know.

Dr. S. C. STANTON—In the summer of 1878 I selected for my graduating thesis in college, "The Distribution of the Sewage of Great Cities, with Especial Reference to Chicago." To procure data I was allowed, through the courtesy of the Commissioners of the Illinois and Michigan Canal, passage on one of their boats from the Illinois River at Peru to Chicago, and secured samples of the water of the canal at twenty-five points between the Illinois River and Lake Michigan, taking three samples at each point, one from the surface, one from three feet below the surface and one from the bottom of the canal, or, at least, six feet below the surface. These specimens were taken above and below towns on the line of the canal, above and below feeders, and at various points in the Chicago River and the lake at the mouth of the river. The results of the analyses of these specimens of water were practically identical with those Dr. Reilly has detailed, namely: That at Summit, eight miles from Bridgeport, the water of the canal contained very little organic impurity. Below every large town there was a marked increase in the amount of organic impurity, and so much so that below Joliet the water contained almost as much organic impurity as at Bridgeport. Below feeders there was again a marked diminution of the amount of impurity, and, as a rule, within four miles below towns the water showed only a slight amount of pollution. These results in graphic form are in the possession of the Sanitary District.

WM. H. WILDER, M.D., Secretary.

## Chicago Pathological Society.

*Regular Meeting, October 12, 1896.*

*(Concluded from page 1346, Vol. XXVII.)*

PRESENTATION OF SPECIMEN.

*Anencephalus et Acrania*, by Dr. JOSEPH B. DE LEE—This specimen is a fresh one, and as I thought it would be of interest to the members of the Society I brought it with me. It

represents an anomaly which is not so uncommon. It comes from a woman, 30 years of age, who, twelve years ago, after three days' labor, bore a small child. She has a contracted pelvis of the justo minor type, and is to a certain extent rachitic. Labor commenced Saturday night at 8 o'clock and by Sunday night at the same time no progress had been made. At 11 o'clock Sunday night the pains were strong and expulsive, but still no progress in labor. In making an examination I could determine the back, and heart tones to the left side, and introducing my hand into the vagina I came upon something which I thought to be the vulva of a female child. I found two lips between which was a depression and on each side of which were two hard lumps which I judged to be the tuberosities of the ischii. Further examination revealed an ear alongside of this, and my previous diagnosis had to be retracted. Continuing the examination my finger ran around the head of this monster, the head of which I succeeded in delivering. The shoulders, however, refused to come in spite of traction which was kept up for twenty minutes, aided by Kristeller expression. Examination also showed the cervix tightly contracted around the neck of the fetus. The larger part of the resistance came from the narrow pelvis. I performed the operation of section of the clavicles, known as cleidotomy, and introduced by Phenomenoff last year. Under the guidance of four fingers, with a strong pair of scissors the clavicles were divided, the chest fell together, and came through without any difficulty.

The nature of the anomaly is apparent. It is a monster in which both the cranial vault and the brain are missing. This little pad which you see consists of hemorrhages, some brain tissue and vessels. The technical term for this monster is anencephalus and acrania.

As to the cause, there are three theories. One is that the medullary canal does not close properly and therefore the cerebral vesicles are not well developed. Another is that acute hydrocephalus in the first two months of pregnancy causes dilatation of the cerebral vesicles and subsequent atrophy. A third theory is that the head fold of the amnion becomes united to the thin membranous covering of the brain, the primordial cranial vault at some period in the early weeks of pregnancy, and the inflammatory adhesions produce this deformity by inhibiting the growth of the brain.

PRESENTATION OF CASE.

*Tricuspid Regurgitation*, by Dr. JOHN A. ROBISON—The case I wish to show you illustrates the difficulties which we sometimes encounter in making a diagnosis of valvular disease of the heart. I thought the case would come in nicely with the discussion on Dr. Herrick's paper.

The patient has been examined by a great many doctors from time to time, but I will not say as many different diagnoses have been made, but quite a number of them have been made. The stumbling block seems to be whether this patient has disease of the right side of the heart or not; in other words, whether he presents a lesion connected with the tricuspid valve, and there have been more physicians who have said that there is no disease of the tricuspid valve than there have been those who have taken the opposite view. We find present in this case undoubted evidence of disease of both the aortic and mitral valves. In the first place, you will notice the character of the pulsations in the neck—the carotid pulsation. Secondly, if you feel the pulse you will get the Corrigan water-hammer pulse, which is greatly accentuated when you put the patient's hands up in this manner. Furthermore, a sphygmographic tracing gives evidence of aortic regurgitation. Listening at the base of the heart over the region of the aortic valves we hear a very soft, almost indefinable murmur with the first heart sound, which is carried slightly upward. We also hear a murmur during the first part of diastole carried slightly downward. Passing to the apex of the heart we heart a murmur at the apex, if my ear does not deceive me. This murmur does not increase in intensity as we go toward the axilla or to the left of the chest, nor do we hear it with the same intensity to the left of the spine as we do in front. Again, you hear a systolic murmur over the whole precordia, but as we travel from the apex of the heart toward the right, we reach a point here near the ensiform cartilage where the intensity of the murmur is greatest. I think if you had time to examine this man I could prove that to you very easily by using the stethoscope I have in my pocket. I have taken a piece of thin glass and glued it in the stethoscope, by means of which I eliminate the muscular sounds of the heart, and I hear simply the murmur. Placing this stethoscope over the apex we hear the murmur during the systole with distinctness, it not being carried upward toward the axilla or around the chest wall. In carrying it to the right toward the ensiform cartilage it becomes more intense until we reach a point below the left border of the sternum, where we hear a loud murmur with each systolic contraction of the heart.

Another point I wish to call attention to is the fact that we have what I would call the venous pulsation in the neck, the pulsation being presystolic; and not only that, by placing the fingers at the junction of the jugular with the subclavian veins we get a pronounced thrill. My diagnosis in this case would be, judging simply from the primary signs of valvular disease, that this man has undoubtedly a tricuspid regurgitant murmur.

The patient, as I have previously said, has been examined by quite a number of physicians; some of them I see here tonight. They dispute that diagnosis. Of course, a case like this presents many difficulties. In the first place, we have an aortic regurgitation which has caused great increase in the size of the heart, so that the apex beat is below the sixth rib and to the left of the nipple to the extent of two fingers in breadth, and there is no doubt but what he has mitral regurgitation; but if this murmur were simply due to mitral regurgitation, why would not the sign of the propagation of the murmur which generally corroborates the diagnosis of mitral regurgitation be present? Furthermore, it is perfectly consistent with our present knowledge of pathology, as illustrated here tonight, that we can have coexisting disease of the tricuspid as well as of the mitral valves, and there is no reason why we may not have tricuspid insufficiency as well, and account for the fact that we hear this murmur in the region where tricuspid insufficiency murmurs are heard.

## SELECTIONS.

**Some Medical Emergencies; a Clinical Discourse.**—Dr. Seymour Taylor, of the West London Hospital, in the *Clinical Journal* gives a practical talk about hyperpyrexia and the like that requires a therapeutic alertness.

1. Hyperpyrexia.—Of late years it has become fashionable to ignore the use of drugs in this condition. The argument has been urged that few medicines have any marked power in reducing temperatures unless the remedies are pushed to such extreme in dosage as to render them a source of danger. But is this really the case? I admit at the onset that I prefer the use of ice packs or the graduated baths. They are quicker in their action, they are easily controlled, and very few houses are without the means of applying either one or the other. But have we no drugs upon which we can depend when we wish to bring a highly feverish and therefore perilous temperature down to a region of safety? I will leave on one side quinin and the phenol compounds, since possibly they may come within the objectionable category which is marked as dangerous. But I will draw your attention for a few minutes to a common food, or drug if you will, which is somewhat neglected as a cooling agent. I refer to alcohol. Probably most of us prescribe it somewhat casually and carelessly, with no instructions as to exact quantity and the periods at which it is to be taken. But I am as certainly convinced as a man can be that when prescribed with intelligence, it is one of the most powerful remedial and restorative agents which we possess. My thoughts were first drawn to the subject of alcohol as a heat-reducing agent, by the refusal of a northern gamekeeper to take some whisky when we were exposed on a cold night; he simply said when I proffered him a flask, "No. It is too cold." These words sank deeply into my mind and caused me much anxious thought. A patient, a heavy and unweildy woman was suffering from typhoid fever in the third week. Her temperature was 105.6 degrees, a point above the danger line. She was quite insensible and was to all appearances about to perish from hyperpyrexia. It was impossible from the surroundings of the patient to administer a graduated bath, or even an iced pack. So we decided on giving alcohol in large doses. Between nine o'clock at night and nine the next morning our patient was made to take twelve ounces of good brandy, an ounce every hour. On the morrow I found her temperature down to 100.5 degrees; she was sensible and appeared astonished when she saw and recognized me as a strange doc-

tor, but was of course quite oblivious to the fact that I had visited her only about twelve hours previously. From this date she made an uninterrupted and good recovery.

2. Relapses in Typhoid Fever.—In a given number of cases of enteric fever a certain percentage of relapses will occur even if our diet sheet be unimpeachable. But there are accidents of the disease, and errors of diet, especially toward convalescence, which may lead up to and actually produce a relapse, or a recrudescence. In the St. Thomas' epidemics we found a large percentage, indeed the majority, of relapses dated from either an action of the bowels after a period of constipation, or from the allowance of bread in the dietary. No matter what the remedy employed to relieve the constipation, whether it was castor oil or a simple enema, the risk was just the same—a rise of temperature dated from the evening of the day on which the bowels acted. The return of febrility might last two or three days, amounting to a recrudescence only, or it might constitute a fresh attack or true relapse. Only last autumn I saw two in which I was called to consult as to the cause of such cases, a sudden return of fever. In both cases enemata had been given and I was enabled to point out that the condition might be temporary only (of two or three days' duration), or it might develop into a genuine relapse. But bread is a far more fatal error. We learned this from the nursing sisters. I can not satisfactorily explain why it should be, but the most alarming and fatal relapses which I have observed were those which commenced on the day following an allowance of bread, whether it was given boiled with milk, or even as toast in the beef tea. I will only only quote one case. An old friend of mine was attacked with typhoid and I saw him in consultation with his family doctor. Then I went away for a three weeks' holiday, being kept informed of his progress every other day. Toward the end of the disease I wrote to his doctor to ask him to exclude bread from his diet for at least another ten days. Three days after my return home I was summoned to his bedside and found all the symptoms of a well-marked relapse. The second fever was more severe than the first and he unhappily perished. Unfortunately, by some mistake a basin of bread and milk had been given to him on the day prior to the fresh rise in temperature.

3. Medication in Fever.—As regards drugs, I have no rule of thumb to lay down. But my practice has followed on Dr. John Harley's plan, to give small doses of gray powder three times a day. Whether the mercurial preparation acts as a partial antiseptic on the bowel, or whether by keeping up a gentle peristalsis and flow through the intestine, it obviates constipation on one hand and diarrhea on the other, I can not quite satisfy my mind. I can only tell you of results. Dr. Harley's death rate in hospital practice was extremely low, and I have had similar happy results by following in his footsteps. We have a remedy, which as a stimulant, is an exceedingly valuable, if neglected, one. I refer to musk. I formerly regarded musk as a disgusting remnant of a barbaric pharmacopeia. But I was induced to try it in a case where profound exhaustion with subsultus were present and when alcoholic stimulant was refused. The result was a happy recovery, and I have had reason to think highly of the preparation in some three or four subsequent cases. Then there is another experience which my note books have afforded me. A high temperature is always in itself a dangerous symptom. Wunderlich fixed the line of danger in typhoid at 105.5 degrees, I think. I would place it even lower, at 105. Those of you who meet with much typhoid take note of it and see how many cases recover which at any time present a temperature of 105 or upward. I do not say that recovery does not take place. I have known many cases get well after this high reading, but the general rule may be stated from a large number of statistics, that a patient who has at any time had a fever of 105, either during the primary attack, or it may be during a relapse, eventually dies.

4. Hemoptysis.—In my experience astringents are for the most part useless, and may even do harm. Suppose, for example, we give tannin, by which the albuminous matter surrounding the intestinal vessels is coagulated, or suppose we prescribe sulphuric acid, by which watery exudation from the vessels is retarded, or by whatever method these astringents act, their final effect is the same; not only do we produce a lessened action on the bowels, but we at the same time, and thereby, bring about an increased tension on the vascular system in general, and so favor a continuance of hemorrhage rather than stop it. I protest I would rather prescribe a saline purgative. And even if these intestinal constringents do exert an effect on so remote a region as a lung's apex, it can only be partial and evanescent. As a brother practitioner once put it to me: "It certainly does seem a long way round for the action of such drugs." To me a much more rational and scientific treatment is to give opium, the drug *par excellence*, which calms the nervous system, combined with digitalis. By these measures we speedily notice amelioration of symptoms. The patient is quieted, his pulse becomes better in tone, and cough, one of the conditions we wish to avoid, is lessened. Then, as a last resource, we can fall back on ergot. All these drugs can be easily given by the mouth, but in these days of pharmaceutic advance and refinement, it is at times advisable, owing to the rapid way they can be administered, to inject the remedies subcutaneously. We all of us carry hypodermic syringes about with us, and tabloids of compressed drugs take up no room in our pockets. I would ask those of you whom I may convince to try and note the effects of the above line of treatment. At any rate you have used remedies which act directly on the circulatory system, which you desire to have somewhat under your control. As a last criticism on the subject of pulmonary bleeding, I would discountenance the use of an ice bag. For me, at any rate, it is difficult to recognize any beneficial action from such treatment. I fail to grasp the notion that any good can accrue from the action of ice through the chest parietes (with its skin, its muscles and its bones), upon a summit of a lung which is not necessarily adherent to these parietes, and in which therefore the circulation is derived from an entirely different set of vessels. Further, it is hardly necessary for me to point to the discomfort to the patient which results from the application of a cold, heavy pad on a part in which tenderness is already a pronounced sign.

5. Whooping Cough with Convulsions.—I have in the last three years been called in consultation to four cases of whooping cough complicated by convulsions. The first case luckily enlightened me. Eclampsia was the serious condition for which extra help was sought. Immediately after my arrival the child had a severe attack of cough, but without any inspiratory "crow." This, however, was followed by convulsion. The diagnosis we arrived at was "whooping cough in its first stage," and that the convulsions were due to and consequent on cerebral engorgement from the cough. This view was confirmed three days afterward, when the typical "crow" was heard and the child developed symmetric black eyes from coughing. The patient's younger sister subsequently developed whooping cough, and being therefore allowed to occupy the same room, she, at my request, spent some time in cultivating a budding artistic ability and made a sketch of her sister's face. Now, the bearing of all this on our treatment will at first appear obscure. But to me the first indication was to allay the cough. We are taught that children, especially infants, bear opium and its derivatives badly. I must demur to this. One has only to give the proper dose and children tolerate it as well as adults. In this case, to the astonishment of my friend in attendance, I suggested morphia, and it acted like magic. I gave 1-50 grain every four hours, with instructions to watch its effect, and to discontinue it if the pupil signs became very pronounced. The paroxysms were less frequent, they were less prolonged, there were no more convulsions and the child made a rapid recovery.

**"Vacation Colonies" in Switzerland.**—It is now twenty years since this beneficent movement, known as the "Ferien-colonien," or vacation colonies, was set on foot in Zurich. It has been very considerably imitated in other cities of Europe to the manifest advantage of thousands of poor school children needing release from overcrowding and other slum influences. Consul Germain, in the *United States Consular Reports* gives a sketch of the rise of the work and the extent to which the colonies are utilized. He says: "These places are selected carefully and usually situated in the mountains, where the air is pure and good lodging and good strong food are provided for, free of all charges. The founder of these colonies is the well known philanthropist, Rev. W. Bion, a Zurich clergyman.

This gentleman was formerly a minister in the small, mountain canton of Appenzell, from whence in 1873 he removed to Zurich. He soon learned that the city air did not suit his five children, accustomed, as they were, to inhale the pure air of their native mountains. For several successive summers he made them spend vacation time in their former home, whence, after a month's stay, they regularly returned with greatly improved health and spirits.

This experience set him to thinking that, if his own children, who were better situated than many others in regard to care and food, derived so much benefit from a stay in the high rural regions, how much good would it do to his poorer neighbors. He first advertised in the daily papers that if he received suitable volunteer support he would begin his proposed work. An amount, a little less than $500, was given him in the first year, 1876, and he sent forth sixty-eight children, divided into three different points in the canton of Appenzell. Each colony was allowed a vacation of two weeks. The physicians and some of the school directors of Zurich were among his earliest supporters. In 1886, he was able to send out forty-nine colonies, comprising 1,128 children; in 1895, the number of colonies was seventy-three and of children 2,198. In twenty years 21,728 children have received the benefits of these recuperation-colonies.

The means of the managing committee not being enough, as a rule, to send all of the needy children to the colonies, such as show the greatest need therefor, on account of poor health, are selected, while those compelled to remain at home are provided with fresh milk and bread twice a day, morning and evenings, in order to compensate them somewhat for the loss of the vacation trip. They can thus enjoy a milk cure during vacation, lasting from three to four weeks, which proves very beneficial.

Close attention from year to year has been paid to the progress and results obtained from the Swiss colonies, so as to ascertain the direct benefits derived from these periodic summer vacations by the participants. Among the particular points closely studied are: Increase of weight of attending children, as compared with those remaining at home; general improvement in health, strength and purity of blood, especially of those suffering from anemia; visible improvement in intellect, as well as increased capacity and willingness to study, etc. The table below shows, after a close study made by the Zurich health officer and observed on thirty-four children, the condition of their blood before and after the vacation period, as well as at several later intervals:

| Description. | Blood coloring. | Blood corpuscles. |
|---|---|---|
| 1. Before departure to the colonies: | *Per mille.* | *Per mille.* |
| Boys | 748 | 725 |
| Girls | 756 | 722 |
| 2. Immediately after return: | | |
| Boys | 886 | 911 |
| Girls | 959 | 955 |
| 3. Two months after return: | | |
| Boys | 820 | 884 |
| Girls | 863 | 924 |
| 4. Four months after return: | | |
| Boys | 869 | 935 |
| Girls | 903 | 982 |

The children are always accompanied to the colonies by teachers or other interested adults and remain while there under constant supervision. Their lodgings, specially prepared for that purpose, are composed of large well ventilated bedrooms, dining rooms, and play rooms; in some of them, bath rooms, etc. The food is very nourishing and healthful, and consists of an abundance of milk and milksops, meat, vegetables, etc., and the location is such as to allow of daily walks and exercise in the open air in forests and meadows, offering at the same time, a beautiful view of Swiss scenery of mountains and lakes. In 1895, the city of Zurich sent 448 children to nine colonies in the high regions of the cantons of Appenzell, St. Gall and Zurich, accompanied and marshaled by forty adults, most of them teachers, and it is said that this year's number will be greater.

One of the Zurich colonies, the "Schwæbrig," which is situated in the canton of Appenzell, has been bought and transformed into a regular sanitarium, where, in 1895, 208 children were cared for outside of the vacation time, between May and November. These children, on account of poor health, needed a longer recuperation and remained there from four to twelve weeks, or until they had recovered their health.

## PRACTICAL NOTES.

**Steresol for Cracks in the Nipples.**—The *Union Méd. du Canada* states that if cracks in the nipples are closed and covered with steresol and a second coat applied in ten minutes, the child can nurse fifteen minutes later without inconvenience. No bandage is necessary.

**Nutritive Value of Meat Broths.**—Some dogs fed exclusively on meat broths, 500 grams, in Vulpian's laboratory, died at the nineteenth day, while others to whom water alone had been given, survived within one day as long, dying the eighteenth day—showing the negative nutritive value of meat broths.—*Gaz. d. O. e d. C.*, November 22, from *Bulletin de Therap* October 23.

**Fractures of the Clavicle.**—In case of irreducible fracture with much displacement, suturing is the only means of avoiding subsequent deformity and also troubles in the nerves and circulation. Février has collected forty-four observations of this treatment, all followed by recovery. In thirteen there had been nervous troubles which were cured by the suture. It must be made at once, before the neuritis has had time to develop, as otherwise it may be difficult to cure. The only inconvenience is the cutaneous anesthesia of the pectoral region, consecutive to section of the supraclavicular filaments of the superficial cervical plexus.—*Presse Méd.*, November 21.

**New Stain for Differentiating the Bacterium Coli and Eberth's Bacillus.**—Ramond has produced a stain with "rubine acid" which stains the bacterium coli red very rapidly, while it does not color typhoid colonies. It is prepared by coloring a tube of lactosed gelatin or gelose at 4 per cent. with a few grains of "rubine acid." It is then decolorized by adding, while warm, two drops of saturated solution of carbonate of soda. It is then filtered and sterilized. It replaces Elsner's gelatin advantageously, and owing to its extreme alkalinization, is not favorable to the growth of other kinds of microbes.—*Bulletin Méd.*, November 11.

**Formalin an Approximate Specific for Ringworm.**—An interesting editorial note has appeared in *Guy's Hospital Gazette* calling attention to a recent paper by Mr. Alfred Salter, on the treatment of ringworm by formic aldehyde, or formalin. This treatment is now so well known in Guy's, and has had such a conspicuous success, that it should be part of the ordinary pactice of every old Guy's man. There seems no doubt that it is the almost specific treatment for the disease, especially in obstinate and hitherto incurable cases. And yet this discovery arose from the annoying fact that the inventor's cultivations of the ringworm microbe were all killed one night through his having left the stopper out of the formalin bottle. So do fates at times turn good out of evil. *The Therapist* (London), November 15.

**Treatment of Tuberculosis with the Salts Ordinarily Contained in the Blood.**—Impressed by the fact that the animals whose blood contains the largest amount of salts are the least liable to tuberculosis, Stadelmann suggests that comparative immunity might be conferred upon human beings by increasing the

amount of salts in the organism. Analysis of the milk of the goat, which we know is comparatively immune to tuberculosis, shows .622 per cent. inorganic salts, while human milk contains .138 per cent., and the milk we know is a product of the blood. Reasoning from this premise that animals whose blood is rich in salts are not disposed to contract the disease, he administers salts to patients hoping to thus annihilate the predisposition. He has tried this treatment in many cases, principally in local manifestations, and announces that the bacilli disappeared from the sputa, and the other objective symptoms showed marked improvement. The salts he administered were sodium carbonate or bicarbonate, ten to forty grams a day. In a few cases he ordered also sodium phosphate, two grams, three times a day, with subcutaneous injections of sodium chlorid, .5 gram daily. While he does not consider his limited number of observations sufficient to determine finally the value of the treatments, yet his success to date induces him to recommend others to experiment with it as it is so simple and harmless and easy of application.—*Nouv. Remèdes*, October 24.

**Statistics of Surgical Intervention in Perforation of Typhoid Fever.**—There are thirty-three cases on record, with five positive cures. The deaths were usually found to have been caused by additional perforations. The sutures held, and Monod states that laparotomy in these cases must not be rejected, as it affords a last chance of recovery.—*Bulletin Méd.*, November 22.

**Maternalization of Milk.**—Eminent scientists have been experimenting to adapt the milk of the cow more closely to the needs of the human infant, and they have succeeded in maternalizing it, as it is called, to a most surprising degree. The milk of the cow is richer in salts and proteids than human milk with less sugar. The amounts of fatty substances are substantially the same. It is made to aproximate human milk by the following process: The quantity of milk needed for the child during the twenty-four hours is poured into a graduated glass jar with a hole near the bottom, corked tight. The jar is then closed with a rubber cover over the top and set away in a cool place in summer and in a warm place in winter. In about four hours the milk separates into the cream and skim milk. A third of the skim milk is then withdrawn through the hole below, and with it a third of the salts and proteids. The milk is retored to its former volume by adding an equal quantity of water to which have been added lactose at the rate of 35 grams and chlorid of sodium one, for each liter. The jar is then well shaken and the contents poured into the sterilizers. If the child does not increase in weight with this according to the normal standards of growth, it is well to add one or two teaspoons of fresh cream each day. This process can be applied on a large scale simply by diluting the fresh milk with one-third of its volume of water, to each liter of which have been added 15 to 20 grams of fresh cream, 35 grams of lactose and one gram of chlorid of sodium.—Dufour in the *Rev. Mens. des Mal. de l'Enfance* for September, *Presse Méd.*, November 25.

**Section of the Vas Deferens.**—The discussion of this subject at the Congress of Urology held at Paris during October, resulted in nothing new, but a recent article in the *Lyon Méd.*, by Nové-Josserand, presents this operation in a little more favorable light. He states the results of his own experience in three cases, with a careful study of forty-three others. He ascribes the retention of urine and other troubles of the kind, to a vesico-prostatic congestion, which is relieved by section of the vas deferens, although this rarely affects the size of the prostate. This, however, is no longer considered essential to the success of the operation. The most positive, gratifying, and the most frequent result obtained is the improvement in the emission of the urine, which may become entirely normal if the retention has not been of too long standing. The pains and the tormenting desire to urinate also pass away, usually at once. Although the operation produces sterility, the patient may retain otherwise the virile function. The unfavorable results, complete retention of urine and noticeable alteration in the general condition and mental faculties, are fortunately transient and not severe (*peu graves*). The operation is so slight that it requires no stay in bed, and even elderly and cachectic patients bear it easily. It has no effect on cases requiring cystotomy, nor where there are complicating tumors, caiculi, peritonitis, pyelonephritis, etc., but it is especially indicated at the middle period of prostatism, when congestion dominates the scene, and leads to cystitis, hematuria and more or less complete retention of urine. Later also, in the presence of old prostatic deformations, it may render great service in diminishing the pains.—*Bulletin Méd.*, November 22.

**Transient Amblyopia During Lactation.**—In a recent number of the *Neurologische Centralblatt* appears a short abstract of a paper in the *Beiträge zur Augenheilkunde* by Dr. Karl Heinzel. He describes four cases of transient blindness occurring during lactation and traceable to interference with the functions of the nervous system. Such a condition, according to Dr. Heinzel, is apt to occur in otherwise healthy women. The first symptoms may manifest themselves before the birth of a child or during the early period of suckling, and consist of interference with the function of the eyes which may proceed to complete blindness. With the ophthalmoscope may be found evidences of more or less inflammation of the nerve. The duration of the symptoms extends over months and usually leads to a partial degree of optic atrophy with perhaps only a just perceptible interference with visual acuteness, and never to permanent blindness. The inference that lactation is in some way connected with the symptoms in these cases was arrived at by a process of exclusion.

**New Method of Arthrotomy.**—The results of resection in coxalgia are so far from satisfactory that Delagenière has been attempting to secure better, by a new method which has proved extremely successful in the two cases in which he has tried it. It consists in gouging the epiphysis, with drainage through the neck and great trochanter. He makes an incision similar to Langenbeck's, only descending lower on the thigh, about two centimeters below the base of the great trochanter, 15 centimeters in length. He detaches the fibers of the gluteus maximus to open up the pelvi-trochanterian muscles; pushes the pyriformis and gluteus medius to one side, and then incises the periosteum from the cotyle to the base of the great trochanter, around its internal and external surfaces. The capsule is opened freely with a T-shaped incision, and the condition of the articulation investigated. The periosteum on each side is loosened in order to work under it. He then cuts out a notch in the superior border of the great trochanter, extending it up to the neck, and proceeds to gouge the neck up to the head; the *évidement* of the head follows, and he is careful to remove the corresponding portion of the cartilage. The operation is completed by the *évidement* of the great trochanter, which he carries down a centimeter below its base in order to form a tunnel, with a regular downward slope, following the direction of the spur of the femur. A metal tube is then inserted in this tunnel, the inner end in the joint and the outer end fastened to the skin. This metal drain is left until recovery is complete. The two patients upon whom he has performed the operation had very grave suppurated coxalgia. All the symptoms rapidly passed away and prompt recovery followed. The advantages of this operation are its extreme simplicity, that the drainage of the diseased articulation and of the epiphysis is definitely secured, while the hip retains its shape and some of its movements. It also seems to be exempt from serious consequences.—*Presse Méd.*, November 21.

NOTE. It is doubtful if this method affords any material advantage over the method of temporary resection of the trochanter and gauze drainage.—ED.

THE
Journal of the American Medical Association
PUBLISHED WEEKLY.

SUBSCRIPTION PRICE, INCLUDING POSTAGE:
Per Annum, in Advance . . . . . $5.00
Single Copies . . . . . 10 Cents.
Subscriptions may begin at any time and be sent to
THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION,
No. 61 Market Street (Occidental Buildings), Chicago, Illinois.

MEMBERSHIP IN THE AMERICAN MEDICAL ASSOCIATION.

This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Henry P. Newman, Venetian Building, Chicago, Ill., sending him a certificate or statement that the applicant is in good standing in his own Society, signed by the President and Secretary of said Society. Attendance as a delegate at an annual meeting of the Association is not necessary to obtain membership.

On receipt of the subscription the weekly JOURNAL of the Association will be forwarded regularly.

Gentlemen already members of the Association should send their annual subscription to the Treasurer, or direct to the JOURNAL office.

All communications and manuscript of whatever character, intended for publication in the JOURNAL, should be addressed to the *Editor*, and all communications relative to the business of the JOURNAL, proof sheets returned, or in regard to subscriptions, should be addressed to THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, 61 Market Street (Occidental Buildings), Chicago.

Original communications are only received with the understanding that they are exclusively contributed to this JOURNAL.

INFORMATION WANTED.

It would greatly facilitate the prompt delivery of the JOURNAL to those members of the ASSOCIATION living in large cities, if they would kindly furnish this office with their street address in those cases where it is omitted from the wrapper of their JOURNAL, as we have been notified by the postmasters of the larger cities that second-class mail matter not having street address, would be placed in the general delivery to await call.

## SATURDAY, JANUARY 2, 1897.

### THE PSEUDO-DIPHTHERITIC BACILLUS.

The fact that the Klebs-Löffler bacillus is closely simulated by a non-virulent organism is well known, and it has been rather largely held that the latter is a variety or modified form of the former that for some reason has lost its special pathogenic qualities. Some observers have maintained that there are several kinds of diphtheria bacillus, while others have considered them all as practically the same, but differing in form and pathogenic power under different conditions. So far there has been no practical test of the virulent and the non-pathogenic forms but that by inoculation, a tedious and impracticable method under most circumstances in actual practice. Guinea pigs are not always available, and the test is most often made by the effects on the patient himself, with the result that for safety the physician concludes all cases, mild or otherwise, to be virulent, and if he is a conscientious practitioner, with modern views as to infection, etc., all the elaborate and troublesome details of isolation and disinfection must be carried out to their fullest extent.

The fact that has also been fairly well established, that many healthy individuals carry in their oral and pharyngeal tracts one or the other of these microbes, further complicates the question and leaves a rather uncomfortable uncertainty as to whether we are ever really safe from diphtheritic infections. The modern precautionary fads of individual cups in religious rites and elsewhere seem almost if not quite fully justified to many minds by the discoveries in bacteriology and pathology of the present day.

To find some better means of reaching a certainty in the distinction of these two forms of organism that so closely resemble each other, and to thus add a little to the possibilities of human happiness that are being now daily encroached upon by bacteriology, is a result that every well-wisher of mankind ought to pray for, but as yet it seems a little too far in the distant future for our comfort. That attempts are being made to solve the problem may be a relief, and as evidence of this we have two recent papers in Dr. WOODHEAD'S *Journal of Pathology and Bacteriology* for December, 1896. In the first of these, Dr. E. A. PETERS, as the result of a large number of experiments and cultures, comes to recognize two types of pathogenic diphtheria bacilli, the long and the short, and two non-pathogenic; also a long form and the short or Hoffman bacillus. The long pathogenic form is the ordinary type, the short is less common and less virulent. The long non-pathogenic form is indistinguishable from the long virulent type, excepting in its effects, and they may therefore be classed together for practical purposes, where inoculation tests are not practicable. The Hoffman bacillus is common in ordinary sore throat and tonsillitis, scarlet fever, rötheln, and in diphtheria in association with the true bacillus of that disease. It resembles the short form of the latter in its mode of growth, and to some extent microscopically, but Dr. PETERS holds that there is "no proof forthcoming that this bacillus is an attenuated form of the diphtheria bacillus, though the short diphtheria bacillus, when it becomes non-pathogenic, tends to resemble Hoffman's bacillus."

In the second paper Drs. COBBETT and PHILLIPS recognize two varieties of non-virulent organisms or pseudo-diphtheritic bacillus, which vary to some extent in microscopic characters and in their reaction with glucose. The typical Klebs-Löffler bacillus is long and shows several segments divided by narrow unstained (with methyl blue) or faintly stained intervals. Its reaction with glucose is acid. Of the two non-pathogenic forms, one that also has an acid reaction closely resembles the true virulent bacillus, while the other, *without this reaction*, differs in many respects, it is usually shorter, has in its early growth at least only one septum, its colonies on serum are whiter and more conspicuous, and the authors, finding no intermediate forms varying in virulence, are inclined to consider it a distinct species. It would seem to correspond with the Hoffman bacillus as described by PETERS as nearly as anything.

The practical deduction from the results of these two independent investigations would seem to be: With a long bacillus in sore throat, use every precaution; with a short one, test the glucose reaction. If further studies confirm these results and develop no

embarrassing complications, we have a valuable practical aid in our diagnosis of diphtheria.

Inasmuch also as all these separate forms appear to be occasionally found in the mouths of healthy persons, these observations do not throw special light on some of the questions of immunity, etc., involved. They are, however, very suggestive and valuable in many respects, and it is to be hoped mark a real advance in our knowledge of the subject.

## THE AMBULANCE IN AMERICAN CITIES.

The *Nineteenth Century*, October, contains an article by Hon. DUDLEY LEIGH on the American system of ambulance service at the hospitals of our larger cities. He just points out the fact that in England the hand-stretcher is yet, as a rule, the only ambulance, although occasionally the old worn-out cab is brought into acquisition.

The idea of instituting horse ambulances, that should be summoned and sent out in cases of illness or accident with the same speed and regularity with which fire engines are called and despatched in the case of fire, originated in the year 1868 with Dr. E. B. DALTON, at that time the superintendent of the New York Hospital. Owing to a change in the disposition of that institution's property the suggestion was not acted upon at the time, but in the following year the Department of Public Charities and Correction approved of Dr. DALTON'S proposals and the code of rules he had drawn u and in consequence an ambulance service was adopted at Bellevue, the Municipal or Free Hospital of New York. From that time forward the system has proved so useful and beneficial that it has gradually extended to all or nearly all the other hospitals in New York, as well as to many other cities in the United States, and has become an integral part of the hospital work, and numberless lives are saved by its agency, and by the speed with which help is brought to the sick and injured.

As has been mentioned before, the municipal or free hospital of New York is Bellevue, where the first ambulance service was adopted in December 1869. In that month there were seventy-four calls; in the next year the number was 1,466.

The following table will show the increase in calls from this time forward, not only in Bellevue, but in other hospitals which have adopted the system, and the year of their so doing:

| NAME OF HOSPITAL. | YEAR WHEN SYSTEM ADOPTED. | | | | | |
|---|---|---|---|---|---|---|
| | 1870 | 1877 | 1878 | 1879 | 1881 | 1892 |
| Bellevue | 1,466 | 1,217 | 1,606 | 1,888 | 2,282 | 4,858 |
| House of Relief | | 1,155 | 1,253 | 1,321 | 2,293 | 3,216 |
| New York | | | 651 | 585 | 1,154 | 1,520 |
| Roosevelt | | | 273 | 291 | 552 | 1,675 |
| St. Vincent | | | | 823 | 1,387 | 2,066 |
| Presbyterian | | | | | 387 | 1,730 |

In 1893 the total number of cases was above 20,000.

The ambulance service of New York City requires vehicles. With the exception of those of the municipal hospitals, these vehicles are under the management of, and maintained by, the respective hospitals, without any assistance from the municipal authorities. The service is controlled by three separate departments: the police, the health, and the commissioners of public charities and corrections. The police commissioners only exercise control in so far as the allotment of an area is concerned, from which individual hospitals receive casualty cases. The commissioners of public charities and corrections maintain and have special charge of and control over the municipal and public hospitals, but the private institutions are independent of their orders. But by arrangement between the hospitals, both public and private, and the commissioners and the police, all sick and injured persons may be taken to whichever hospital may be the nearest, the object being to insure the quickest possible medical or surgical treatment. The private hospitals enter into such an agreement because of the experience and practice it affords to the physicians and surgeons connected with them; indeed, so much has the ambulance service become a part of the New York hospital system that there is a great desire to secure an allotment of an area, so as to ensure a share of the accident and emergency cases that occur. No hospital, in fact, in New York could now be carried on without ambulances; a hospital without an ambulance would be without patients. The ambulance surgeons are not students merely but are sub-juniors of the hospital house-staff, holding the degree of M. D., and they give their services gratuitously on account of the experience they gain.

The ambulance used in New York is of the ABBOT-DOWNING type, and has a covered arched roof, room for the bed before mentioned, on which the patient can lie at full length, and for the surgeon and the various instruments and appliances he carries with him. The cost in New York is $550, or allowing for the difference in the purchasing power of money in England and in America, about £85 to £90 in English money. The cost of maintaining an ambulance in New York is about $920 to $1,000 (£190 to £208), which may be considered equal to about £150 in England, this estimate including the wages and board of the driver, forage for the horse, and keeping the ambulance in repair.

The excellent example set by New York in regard to its ambulance service has been copied in its general principles by most of the big towns in the United States, though the systems pursued differ in various details. For instance, in Philadelphia, Norwich (Connecticut) and Chicago, the police have the chief charge of the service, though in Philadelphia other ambulances are maintained by private hospitals and institutions.

In St. Louis one ambulance is kept by the police and one at the Railway Hospital, while others are

maintained by their Department of Health. At Pittsburg twelve patrol wagons are used by the police for ambulance purposes, while at the same time all the hospitals in that city have ambulances ready. In Boston five of the general hospitals have six ambulances in use altogether, the municipal hospitals have three, while the police department has seven. In New Orleans the service is under the direction of the administrators of their Charity Hospital, which is supported in a manner that in one of its details would scarcely be recognized in this country.

Numberless lives have been saved, not only in New York, but in many other cities that have followed the admirable example it first set, by the speed with which the ambulances reach the sick and injured, bringing help that literally wrests back the sufferer from the jaws of death, as the last flickering spark of life is leaving the body. As, in the case of fire, the first few seconds or minutes are proverbially the most critical, so it is often in the case of accident or illness, and many lives are lost by injuries received in the streets of London and the other great cities of England, owing to the delay in reaching the scene of accident with a hand-stretcher, that might be saved were the New York system in universal use. And, if a conveyance is employed in any English town in the case of accident, what is it? Generally a four-wheeled cab or such-like unsuitable vehicle perhaps to convey the patient for a distance of several miles to the nearest hospital, when suffering from broken limbs, the cramped position necessary in such a conveyance causing the sufferer excruciating agony.

The police department, if it were so decided, might introduce and take charge of the ambulances, as the police do in Chicago and other cities of the United States. But probably the most satisfactory way of all would be for the London County Council to take up the matter, either by subsidizing the hospitals according to the number of ambulances employed by each, as in Brooklyn, or by working them by means of their own employes, in conjunction with the hospitals. The first plan of the two would probably prove the most satisfactory; but as to the details, it would be for the future to decide them. It has only been attempted in this slight sketch to draw some attention to what is being done by other countries in the alleviation of human suffering, and it seems impossible not to believe but that in the greater London of the future the same kind of system will ultimately prevail, by whatever means it is set in motion. And certainly, when ambulance wagons take the place of the present old-world stretcher, or the worn-out cab so often made use of in this great city, it will be a matter of wonder that, with all our many philanthropic schemes, and all our efforts to minimize the terrible suffering that flesh is heir to, we have so long neglected an example set us by far younger cities than our own.

## THE EMERGENCY RATION OF THE ARMY.

Under the authority vested in him by Section 1146 Revised Statutes, the President has established an emergency ration for troops operating for short periods under circumstances which require them to depend upon supplies carried on their persons. This ration has been adopted after full consideration of the subject by boards of officers convened for the purpose. Forty-five officers, all men of rank, years and experience, served on these boards, the membership of which included 9 medical and 9 subsistence officers, 18 infantry, 6 cavalry, and 2 artillery officers, and 1 inspector general. The ration adopted may therefore be accepted as the best that can be provided by the knowledge and experience of the military men of this country.

The want of a special and distinctive emergency ration in our service has been a subject of discussion, particularly by line officers, since the time of the Franco-Prussian war, when so much was heard of the value of the iron ration of the German troops. In April, 1895, the Commissary General of Subsistence addressed a letter to the Adjutant General of the army, in which he invited attention to this want, and suggested the appointment of a board of officers in each of the eight military departments to consider and recommend a suitable ration. This suggestion was approved by the Secretary of War, and a board consisting of one medical, one subsistence, and three line officers was appointed in each of the departments. These emergency ration boards were in session during the summer and autumn of 1895. They communicated with the food manufacturing firms of the country and investigated samples of all kinds of concentrated food that could be procured. In some of the departments detachments of troops were sent out on field service to put the ration recommended to a practical test. When the reports reached the War Department a board of officers was convened in Washington, D. C., to examine the reports of the departmental boards and to consider such views and suggestions as the Major General Commanding the Army and the Commissary General might lay before it; also to make recommendations on the subject and to report upon the minimum amount of articles of food necessary to sustain a soldier in health and activity while in active service in the field for a limited period. The report of this board was approved and on December 5, 1896, the order establishing the emergency ration was published.

The consideration of an emergency ration by the military authorities led to popular anticipations of the discovery and adoption of some form of concentrated food which would sustain the vital energies under a heavy strain while having but little bulk and weight to incommode the soldier on his march. These anticipations found expression in the daily

papers and even in some of the medical journals. Kola advertisements fostered this idea. The practical men of the army found, however, that the advance of science has not yet enabled the human system to be independent of physiologic laws. They concluded that when work is to be accomplished by the human machine a certain quantity of the organic elements must be supplied; and as in emergencies hard service is generally to be expected, the principle was adopted that the emergency ration should contain as much of the food elements as is necessary to sustain the soldier under the maximum of physical strain. The conservatism and good sense of these military boards are shown by the manner in which they disposed of all suggestions of concentrated meats, pemmicans, pastes, etc. It would be unwise to select as the staples of an emergency ration any article of food with which the soldier is not familiar, or which would make a material change in his dietary during the continuance of the emergency. The emergency ration, therefore, consists of a hard labor allowance of the ordinary articles of the soldier's ration. Saccharin is substituted for sugar, and tobacco is added on account of the difficulty sometimes experienced by troops in procuring the latter during the emergencies of a campaign. In another part of this issue we print a Summary of the Proceedings, Conclusions and Recommendations of the Emergency Ration Board, as a valuable contribution to the literature of food and dietaries.

## THE JOURNAL ITSELF.

It is with great pleasure that we announce to our readers that the last year of the JOURNAL has been one of unwonted prosperity notwithstanding the continued stringency of the times, and that its growth has been steady and continuous. In the last three months the circulation has grown faster than ever before in its history. One reason for this has been the sincere desire of the members themselves to increase the strength of the organization, by inducing acquaintances to become colleagues, and another reason has undoubtedly been that the JOURNAL has furnished satisfactory material to the ASSOCIATION. Certainly its volume has never been so great. Exclusive of advertising pages, the JOURNAL furnished 1,364 pages quarto, the most part in closely printed type. No count is taken of advertising pages, title page nor index, and the index itself for these six months is of immense value. Three hundred and six members contributed original articles to the JOURNAL during the six months.

It is to be remembered, however, that many of the advertisers who were formerly giving formulæ, have ceased to advertise because unwilling any longer to publish them, and the losses of the JOURNAL on that account will be greater next year than in former years; but, notwithstanding, with the steady increase of membership, a movement which seems impossible that it can now be prevented by any change of sentiment, will probably counteract this. The character of the advertising carried in the JOURNAL has been made during the last volume to conform to the rule of the ASSOCIATION, which requires the formulæ of all proprietary medicines to be printed. With the encouragement that the past few months have furnished, let us all take hold of the work of organization in earnest. Let us have 10,000 members in this anniversary year!

# CORRESPONDENCE.

### Ether and Chloroform.

CHICAGO, Dec. 24, 1896.

*To the Editor:*—An article in the JOURNAL of December 19, by Dr. W. S. Caldwell, has been of great interest to me for several reasons. One reason is I do not agree with the conclusions drawn; but I am not prepared to combat them with statistics and cases and I will not take up the gauntlet on that score. In one place, however, Dr. Caldwell says "anesthetics are most skillfully given in large hospitals." I do not believe this statement is true. Anesthetics are usually (in hospitals) given by the junior interne during his first three months' service; though he may become quite skillful before his service in that department is over, yet for the greater part of that time he must be considered unskilled. Unfortunately, as a rule, he is given no instruction whatever and must get his skill by the hardest kind of experience and wholly at the expense of his patients. Even Dr. Caldwell credits one hospital surgeon with the statement that the interne "must kill a patient or two before he can get his hand in." Why not then employ an experiencced man and require the anesthetist to get his experience as the surgeon does.

I wish to call particular attention to the Doctor's italics when referring to chloroform. They are as follows: "*Great care*," "*trained* and *skilled*," "*proper hands*," "*proper precautions*," "*more care*," "*safer* in *skilled hands*," "*properly administered*," "*skilled*." Here then we have his most emphatic arraignment of chloroform and his argument for ether. Any student, laborer, messenger boy, or member of the patient's family may safely (?) give ether, but chloroform requires a careful, experienced man; therefore he concludes chloroform should not be given. As well say that because it requires an expert to do a laparotomy, such operations should not be done at all.

But it is not my purpose to try to convince the ether givers of their error, but rather to use his paper as a text to plead the cause of the anesthetist. I do this, not with a desire to be regarded as a specialist in this underrated but very necessary branch of medical art, but rather because I happen to be familiar with the difficulties under which the anesthetist labors.

In fully 50 per cent. of the cases requiring an anesthetic, there is more danger to the patient in the anesthetic than there is in the operation which makes it necessary. If training and skill are exacted of the surgeon, why should they not be exacted of the man also who gives the anesthetic? The life of the patient is in many cases jeopardized as much by the one as by the other. In a large percentage of cases the skill required of the anesthetist in giving the anesthetic is fully as great as that required of the surgeon in doing the operation. This being the case, why is it that so many patients, and not a few surgeons, seem to think that the anesthetist is entitled to little or no compensation? The remedy lies with the sur-

geon. He too often tells the patient that the operation will cost $100 or $200 and that he will bring a doctor to assist and one to give the anesthetic. When the operation is done, he will say to the anesthetist, "You will get $5 out of this when I get my pay." In that case the surgeon gets the first $195 and the anesthetist gets the last $5; or if five or six months have gone by, the surgeon has probably forgotten all about it and the anesthetist gets nothing. If there is any trouble about the bill and the whole of it is not paid the anesthetist's share is usually included in the unpaid portion.

To a young doctor in Chicago who wishes to learn surgery, it is a positive disadvantage to acquire a reputation for expertness in administering anesthetics. He is called upon to take this part in all cases where the work is wholly charity, and in many cases where all the work, except his, is paid for. Under such circumstances is it any wonder that the knowing ones decline this task and that the most unskilled are the ones on whom this great responsibility most often devolves? He considers the work he is doing as altogether unimportant and uninteresting and mechanically pours on the ether or chloroform, while his whole attention is concentrated on the operation. Is it any wonder that deaths occur under such circumstances? The vigilant anesthetist will not let his attention be attracted from his patient's condition for the fraction of a minute during the whole operation.

In the past two years and two weeks I have administered chloroform 161 times and ether once. Three times have I had respiration stop; twice in the case of smokers and once where too much chloroform was given. In all cases, by promptly removing the mask and using proper means, the patients were quickly restored. I will relate my experience in the matter of compensation: For these 162 anesthetics I have received just $327, an average of $2.63 each. Many of these required that I leave home at 8 o'clock and kept me away till afternoon, usually carfare and sometimes railroad fare to pay. As a partial remedy to these evils, I would suggest that the surgeon state plainly to the patient that he can not do the operation alone, that he must have an assistant and some one to give the anesthetic, and that they must be paid. Then let these assistants send their bills in separately and take their chances with the surgeon on getting their pay. Then as the anesthetist will, in all probability, not see the patient again, a suggestion that he be paid in cash, would usually be complied with. I have such an arrangement with two surgeons for whom I frequently give anesthetics and I see no possible objection to it. Under no circumstances will I send in a bill for less than $10.

On one occasion, about a year ago, I was invited to attend an operation. On my arrival I found the assembled doctors holding a consultation; the patient's condition was such that it was feared she would not survive the anesthetic and the man who was there to administer it refused to go on. The surgeon considered the operation imperative and he and the husband urged me to try giving her chloroform. I anesthetized her and during the operation she lay so quiet that she appeared to be dead; even the operator stopped two or three times to inquire whether all was well. The husband spent the time alternately weeping by my side and in the next room on his knees praying. When the patient was returned to her bed and we prepared to go the husband objected to our leaving until she regained consciousness, although the family physician had indicated his intention to stay. Eight times at monthly intervals I sent in my bill, and as regularly it was ignored. Then I sent a collector to see him; he told the collector that he did not invite me to his house. I came there of my own accord and he guessed that I would have to look to myself for my pay. He also said that I had "nerve" to send in a bill for a little thing like that; he supposed doctors were glad to do that for the experience they got out of it.

I gave chloroform to a woman, the wife of a business man down town, and sent in a bill of $10. After the lapse of considerable time she sent me $5 with the statement that she had "consulted no less than a dozen of the most prominent doctors in the city and they all said that $5 was the very highest fee ever charged for giving an anesthetic." I wondered whether these "prominent" doctors charged $10 each for these consultations. On another occasion I received a message requesting me to come to a suburban town to give an anesthetic. On my arrival there I found the patient to be a doctor whom I had never seen or heard of before. The operator told me that the patient was a wealthy man and owned a good deal of business property in a prosperous city in Minnesota. I sent him a bill and got a reply in which he said he was "astonished beyond measure" at my sending him a bill; he said that he had never yet paid a doctor for professional services and intimated that he never expected to. I left home at 8 A.M. to go to this case, got back at 3 P.M. and paid railroad fare both ways. Of these 162 patients whom I have anesthetized, 61 paid something. But the patience of the editor and the space of the JOURNAL would both be exhausted before I could exhaust the reasons given by the other 101 for not paying anything. Yours very truly,

D. H. GALLOWAY, M.D.

200 Oakwood Boulevard.

## Harvey Medical College.

CHICAGO, ILL., Dec. 18, 1896.

*To the Editor:*—At a recent meeting of the faculty of the Harvey Medical College the following resolutions were passed unanimously:

"That the licensing power to the practice of medicine in the State of Illinois be taken from the State Board of Health and given to a separate board of medical examiners.

"That a diploma from a medical school of good standing shall be a necessary qualification for examination.

"That the examination shall be in the English language."

A committee was appointed to confer with a joint committee of the State medical societies to assist in furthering the passage of the bill.

Does this look as if the faculty of the Harvey Medical College desire or intend to run a diploma mill?

BYRON ROBINSON, M.D.

# PUBLIC HEALTH.

**Insusceptibility to Vaccination, a Very Rare or non-existant Condition.**—In the last report of the medical officer of the Local Government Board it was stated that among 88,875 successive vaccinations by the officers of the board, whether with humanized lymph or with calf lymph, no case of insusceptibility had been met with; that is to say, in no case of primary vaccination had the individual been vaccinated three times unsuccessfully. The statement has caused some expressions of astonishment, especially as it was accompanied by another to the effect that no less than 1,983 certificates of insusceptibility had been granted by medical practitioners in England and Wales during the last year reported on. There is, therefore, some interest in noting what has been the result at other than Government public stations, where, presumably, the operation has been performed with perfectly fresh—that is, unstored—lymph. We now note that Mr. O. Lowsley, public vaccinator for Reading, recently announced to the Reading Board of Guardians that out of 14,000 children whom he had vaccinated he had "never found a case of insusceptibility." Although "insusceptibility" to vaccination is admitted by law it really becomes doubtful whether it has more than a legalized existence.—London *Lancet*, November 14.

**Practical and Inexpensive Methods of Disinfecting with Formic Aldehyde.**—1. Spray: Wet wall, furniture, etc., all over and on

every side with a 2 per cent. solution of formic aldehyde and close the rooms for twenty-four hours. Sixty to seventy c.c. of this solution will disinfect one square meter. 2. Evaporation of cloths wet with formic aldehyde: Dip the cloths in a solution of a 35 per cent. solution of formic aldehyde, one liter to 500 grams of chlorid of lime, and suspend in the rooms to be disinfected for twenty-four hours. One cloth two meters square will disinfect eight cubic meters. Sixty to seventy square centimeters of this solution are necessary for each cubic meter. Formic aldehyde is especially adapted to the disinfection of books and furs. The price is moderate, but the eyes must be protected by special glasses, the nose and mouth by a double mask of cotton, and the hands by gloves into which vaselin has been well rubbed. These processes are recommended by Nils Englund in the *Hyg. Rundsch.*, page 306, as the most efficacious.—*Nouv. Remèdes*, October 24.

**The Water Supply at the West Point Military Academy.**—The Board of Visitors at the Academy has reported adversely upon the condition of the water-supply at the Academy, and strongly advise an attempt at purification by filtration.

At the present time work is in progress on a reservoir for the collection of the running waters of the Cascade and Crow's Nest stream during the season of their free flow, with additions, when necessary, from the round pond. The reservoir is intended to hold 75,000,000 gallons, and when finished will give the post a water supply assured as to quantity. It should be filtered before distribution, not so much for the improvement of its chemical character as for the removal of the particular cause of the periodic fever.

"In the United States we are not so careful to the purity of our water supplies as are the people of Europe," says the reporter, "and in consequence we have an access of typhoid, malarial and so-called typho-malarial fevers. The laws of Germany direct specifically the filtering of all surface waters before they are delivered for public consumption. In England and continental Europe, the filter bed is an integral part of the water system, when the water is not from a naturally filtered spring or deep well sources."

Dr. Joseph D. Bryant, physician to the President, and a member of the board, signed his name to the report.

**Bacillus of Hospital Gangrene.**—The *British Medical Journal*, December 6, has a very interesting article on the above subject based upon a paper by Dr. Vincent, in *Annales de l'Institut Pasteur*, September 25, in which he claims to have discovered the bacillus in question in forty-seven wounded cases returned to Algiers from Madagascar. The pseudo-membranous pulp covering the ulcer contained, in every case, a bacillus varying in length from four to eight micromillimeters and about one micromillimeter broad. It was straight or slightly curved, with rounded ends and irregular vacuolation; many were segmented. It was decolorized by Gram's method and best stained by thionin. The number in a preparation varied directly with the virulence of the case; the pulp from the worst forms resembled a pure culture of the organism. The bacillus was found to have great power of resistance to antiseptics; it was present in large amount in wounds which had been treated for ten days with iodoform and sublimate compresses. The number of cellular elements present varied inversely as that of bacilli, and in favorable cases numerous leucocytes and large uninuclear cells could be seen engulfing the microbes. In forty out of the forty-seven cases a spirillum was also present, usually in small amount, but in two instances outnumbering the bacillus. Vincent considers the latter the pathogenic organism of hospital gangrene; its most abundant seat is immediately beneath the layer of pseudo-membranous exudation, in which respect it resembles the Klebs-Löffler bacillus of diphtheria. The process evoked by it is necrotic and hemorrhagic, but its action, even in severe cases, is mainly local, the internal organs suffering but little, though the connective and muscular tissues may be much disorganized. Inoculation of the pus from hospital gangrene into wounds artificially produced in animals, or its subcutaneous injection in man, led to no lesions, so that it had to be supposed that special conditions were necessary as adjuvant factors in the etiology of the disease. Inoculation into a rabbit suffering from general tuberculosis, however, caused the formation of an unhealthy wound containing large numbers of the gangrene bacillus and similar results were obtained by injecting this organism, mixed cultures of streptococci, colon bacilli, etc. These associated bacilli, if they developed in the wound, occupied a position more superficial than that of the specific germ. There are, therefore, two special factors necessary to the development of hospital gangrene in the human subject, a condition of inanition in the patient, and an association of the specific virus with other microbes. The bacillus also has but little action when alone, requiring the preëxistence of a gangrenous ulcer evoked by other organisms. It is the prevention of the growth of these other forms by means of antisepsis that has rendered hospital gangrene so rare at the present day.

**The Duration of Life in the Medical Profession.**—Dr. Haegler, chief medical officer to the General Ineurance Company of Basle, has recently published an interesting essay on the duration of life in the medical profession. It has long been known that among medical men the duration of life is shorter than among the general population of a like age, and that clergyman, for instance, on an average live twenty years longer than medical practitioners. According to some old statistics of the kingdom of Bavaria only school-masters in rural districts have a less expectation of life than members of the medical profession, 75 per cent. of the latter dying before the fiftieth year and 90 per cent. before the sixtieth year of age. These numbers, however, seem to be exaggerated, for a new statistical work on the Kingdom of Saxony, by Dr. Geissler, states that 80 per cent. of the practitioners of that country, reached their sixtieth and 25 per cent. even their seventieth year. It is worth mention that medical mortality is very high, especially in the early years after entering on practice, and the life insurance premium to be paid by medical practitioners is on this account 10 per cent. higher than the general insurance rate. The excessive mortality in our profession is not only caused by infectious diseases, which medical practitioners are liable to contract, but also to over-exertion and the impossibility of securing regular seasons for rest and meals. Typhoid fever and diseases of the lungs (phthisis excepted) are very frequent as causes of death, while suicide is rarer than among the general population. It is generally recognized that the conditions of life prevailing among any particular class or section of the population have an important bearing on the occurrence of longevity in that class. In former times the services of medical men were but little esteemed; their incomes were as a rule very small, and consequently their average lifetime was short. Then came a period when the condition of the practitioner improved, and accordingly the average duration of life increased, but during the last ten or twenty years various circumstances, including the overcrowding of the profession, have combined to lower the standard of living, and there is thus reason to suppose that the duration of life will be correspondingly shortened.—*London Lancet*, September 12.

**Increasing Demands upon Laboratories for Official Bacterioscopy.**—In the *Boston Medical and Surgical Journal*, December 3, Dr. Francis H. Williams relates the bacterial history of an instructive case of diphtheria, with remarks showing the importance of having two or more negative cultures, before the patient shall have been released from quarantine. His case, A. B., a child, was taken ill with diphtheria, and his younger brother

and nurse were sent, for fear of contagion, to the house of a relative in another town. Soon after its removal the younger child complained of its throat. I was called in consultation, and although there was no membrane to be seen, and this did not appear until the following day, I found the bacilli directly in a cover glass preparation made at the bedside, and the cultures showed them likewise on the following day. I also had cultures made from the throat of the child's nurse, although it showed no indication of diphtheria, and found bacilli there also. If the bacterial test had been applied before they left home, the bacilli would probably have been found then in the throats of both the younger child and nurse. They could have been treated immediately, which is of great importance, and the risk of carrying the disease in another household would have been prevented. The following case demonstrates the importance of the bacterial test during convalescence. The throat of this patient, D. C., was perfectly clear within a week after the injection of the antitoxin, but the bacilli lingered, as this record of cultures made in the Harvard Medical School shows:

| | | |
|---|---|---|
| April 25, positive. | June 13, positive. | July 21, positive. |
| 28, positive. | 16, negative. | 25, positive. |
| 30, positive. | 18, positive. | 28, positive. |
| May 5, positive. | 19, negative. | Aug. 4, positive. |
| 10, positive. | 20, positive. | 11, positive. |
| 12, positive. | 21, positive. | 19, positive. |
| 17, positive. | 23, positive. | 25, positive. |
| 23, positive. | 25, positive. | Sept. 1, positive. |
| 26, positive. | 26, positive. | 9, positive. |
| 30, positive. | 28, positive. | 15, positive. |
| June 2, positive. | 30, positive. | 22, positive. |
| 5, negative. | July 2, positive. | 29, positive. |
| 7, positive. | 7, positive. | Oct. 5, negative. |
| 9, negative. | 9, positive. | 6, negative. |
| 11, positive. | 14, positive. | |

The patient was able to be about within a short time, and yet was dangerous to others; in October cultures made from her throat were sufficiently virulent to kill a guinea pig in thirty-six hours. Dr. Williams, in commenting upon this and like cases, remarks that the laity do not realize that diphtheria is not usually transferred from one person to another except by actual contact through the hands or mouth, or by infected clothing, utensils, etc. The bacillus is not a motile one, and this disease is essentially one the germs of which are put into the mouth or nose by the hands. The slight annoyance which taking a swab causes an individual will be acquiesced in when it is understood that the disease is not, as a rule, a dangerous one when treated early. The cardinal point is to ascertain who are infected; and this can be done by means of the bacterial test, which should, of course, be followed by intelligent isolation and treatment. The application of this test to every member of the given "group" as soon as a case of diphtheria occurs, is made practicable by the excellent laboratories already established, and from the fact that the laity are becoming more and more appreciative of its usefulness. It should be applied to both nose and throat, and a second test should be made after a few days to those in whom the first was negative. A thorough use of the test would make unnecessary much of the quarantine that is so obnoxious and burdensome to many, and although it entails some expense, yet if looked at merely from a money point of view, it is cheaper in the long run. Unless the bacterial test is carried out systematically and intelligently, it will be necessary to continue to spend large sums of money for the care of patients who should not have been ill, and some lives will be lost that might have been saved.

## NECROLOGY.

H. Newell Martin, M.D., formerly of Baltimore and recently of Burley in Yorkshire, England, died October 27, aged 48 years. Dr. Martin was a distinguished biologist, whose name was well known to English readers from his association with the late Professor Huxley in the authorship of the "Manual of Practical Instruction in Elementary Biology," published in 1875. He studied at Cambridge University and was for some time a fellow of Christ's College; he was also a Doctor of Science of London University. The greater part of his working life was, however, passed in America, where he for more than twenty years held the appointment of professor of biology at the Johns Hopkins University, Baltimore. While in America he wrote a work called "The Human Body," as well as several physiologic treatises, which obtained a wide circulation. He did some valuable work, and especially he discovered a method of maintaining the circulation artificially through the mammalian heart after its separation from the body, so that the effect of various conditions and the action of various drugs upon it could be ascertained without the complication which usually arises from its connection with the central nervous system. Dr. Martin was much beloved by all who knew him, and all physiologists will lament the early death of such a gifted and promising investigator.

George H. Taylor, M.D., of New York City, died December 9, in the 76th year of his age. He was born at Williston, Vt., and in his early life was a teacher in the common schools. Becoming interested in chemistry, he devoted his spare time to its study and later made a specialty of physiology. He was graduated from the New York Medical College in 1852 and at once began the practice of medicine in this city, where he had since resided. He became interested in the curative effects of massage and the Swedish movement cure and in 1858 visited Sweden. In 1864 he invented mechanical massage and subsequently established the Improved Movement Cure Institute, of which he was consulting physician at the time of his death. He was the author of a number of books and treatises on medical subjects. He leaves a wife, one daughter and a son.

John Davis Castner, M.D., of Brooklyn, died November 13, aged 27 years. He was a graduate of the New York University, class of 1893, and for a time made his home at Newark, N. J., but about six months ago removed to Brooklyn, chiefly for the purpose of serving as ambulance surgeon at the Eastern District Hospital. A few weeks later he manifested pulmonary symptoms, tuberculous in character, in regard to which he was aware of a strong hereditary predisposition. It is not probable that his hospital work had any part in his infection by tuberculosis. He was a well informed young man, studious and industrious, with promise of a useful future.

Professor Buka, of Berlin, has recently died in his 45th year. An eminent physicist, who has contributed materially to the utilization and improvement of the Roentgen ray.

Professor Straus, professor of experimental and comparative pathology, at Paris, in his 52nd year. He came from Strasburg to Paris without friends or influence and succeeded in making a name and position for himself, by his enthusiastic devotion to science and talent for teaching. His work published last year on "Tuberculosis and its Bacillus," is his best monument.

## MISCELLANY.

### Emergency Rations for the Army.

**Summary of Proceedings, Conclusions, and Recommendations of the Emergency Ration Board.**

War Department, Washington, D. C., May 4, 1896.

The board met, pursuant to the foregoing order [Special Order No. 74, Headquarters Army, Adjutant-General's Office, March 28, 1896], on March 31, 1896, and after some discussion it was decided that all reports and correspondence submitted to the board should be carefully read by its members individually, in order that each should have a full understanding of the subject submitted to it before further proceedings were held. The board has held frequent sessions during the past month, as is shown by the accompanying daily record of proceedings.

The questions as to what should constitute such an emergency as to require the use of the emergency ration was first

discussed, and it was decided that in the opinion of the board "emergencies" are occasions on which, from any cause, the troops are mainly dependent on food carried on the person.

The emergency rations recommended by the department boards were then considered, in connection with various articles of food supply submitted to this board, as suggested components of an emergency ration, and with the various communications on these articles and on the general subject. It appears that of the eight boards, six recommended a hard bread, pure and simple, one a bread from whole wheat, and another a hard bread composed of one-fifth oatmeal and four fifths wheat.

In the matter of meat, five of the boards recommended bacon, one dried (chipped smoked) beef, another a cooked beef, one-third of which should be fat, and a third board a meat compound composed of one part pork and three parts corned beef.

The reports of the department boards indicate a general belief that it would be unwise to select, as the staples of an emergency ration, any article of food with which the soldier is not familiar, or which would make a material change in his dietary during the continuance of the emergency; for articles of known value will give greater satisfaction, other things being equal, than those of unknown or unusual character, and change of diet is to be deprecated at a time when the energies of the soldier have to be sustained under conditions of strain.

This board concurs in these views, and therefore rejects the suggestion of a bread containing oatmeal, which although nutritious, palatable, and in other respects good, is open to the objection that, while it may be satisfying to individuals, the more familiar wheaten biscuit or hard bread is probably more acceptible to the majority of soldiers. It rejects, also, the bread made from whole wheat as known to be causative of diarrhea, and when tried, as was to be expected, it failed.

On similar grounds, this board rejects all suggestions of pemmicans or meat pastes prepared from dried and powdered beef, although some of these make nutritious and palatable dishes when well spiced and highly flavored with extractives. It rejects the suggestion of corned beef and dried and smoked beef, because much of the extractives are lost and the albuminoids hardened in their manufacture, and the suggestion of canned cooked beef, because such meats are acknowledged by the canners to be flavorless unless there is present at least 35 to 75 per cent. of water, thus involving the transportation of that amount of innutritious matter in the ration. Many of the canned samples submitted to this board of stews, roast and boiled meats, etc., although otherwise good, are objectionable on this ground. The suggestion of peptonized or partially predigested meat is wholly at variance with the object in view in carrying an emergency ration which is to furnish to sound digestions the materials to keep them in function.

As all the department boards reported favorably on some variety of compressed soup to furnish a highly nitrogenous staple of the ration, and as the documentary evidence is strongly in favor of such an article, and as, moreover, this board has satisfied itself by personal experiment with regard to the preparation, palatability, and keeping qualities of certain of the compressed soups submitted, it concurs in the unanimous opinion of the department boards.

It was therefore decided that the three food staples of the emergency ration to be recommended for adoption should, in general terms, consist of hard bread, bacon, and some variety of compressed soup.

The board then proceeded to consider the character of the hard wheaten bread to be recommended as a portion of the emergency ration. It rejected the suggestion that any substance of a fatty nature be incorporated in the bread, as the evidence showed that such additions detracted from the keeping qualities of the finished article, and as, moreover, the bacon already recommended as a staple of the ration would furnish the soldier with the needful fat to be used at his pleasure. It examined certain samples of hard bread submitted to it, and concluded that the best sample was that which became soonest permeated when soaked in hot water. The sample which gave the best response to this test was one which was slightly aerated, its substance being evenly pervaded with minute or pin-point vacuolations. Its density was somewhat lessened by this porosity, so that, pound for pound, it would occupy somewhat more space than ordinary hard bread; but the board considered that this could be offset in great part by exposing the aerated hard bread to a higher degree of heat than is used in the baking of the ordinary bread; by this treatment weight would be lessened by getting rid of a small percentage of water, the percentage of the nutritive elements being thereby increased, while some of the starch would be converted into dextrine. The ready permeability of this biscuit would reduce to a minimum the number of cases of diarrhea that in field service so frequently originate in imperfectly softened and masticated hard broad. It was the unanimous opinion of the board that bread thus permeable, and browned on the surface, would be improved in its keeping and nutritious qualities, and be more acceptable to the men than the present issue.

In conclusion, on this subject the board decided to recommend, as the hard bread of the emergency ration, that quality of bread which should form at the time the regulation issue of the Subsistence Department. The board, however, in this connection, desires to invite the attention of superior authority to the possibility of improving the quality of the ordinary hard bread ration on the lines indicated above.

The character of the bacon of the emergency ration was then discussed to determine whether it should be cooked or raw, or partially cooked, *i. e.*, sterilized, and whether it was advisable to have a selected bacon containing, for instance, a larger percentage of lean than is found in ordinary issues. As a result of a full discussion of these points, the board decided on recommending as the bacon of the emergency ration an uncooked bacon of the quality which at the time should form the regular issue of the Subsistence Department, preference being given to those cuts having the largest proportion of lean meat.

The board then proceeded to discuss the character of the soup-making material which it desired to recommend as a component of the emergency ration. On account of a deficiency of proteids in the hard bread and bacon already recommended, it was evident that this component should contain a large per cent. of this proximate element. This could be done either by incorporating powdered beef, or by the use of pea or bean meal. As a matter of fact, one or the other of these meals appeared to enter into the composition of most of the samples submitted to the board. Most of them purported to contain meat, and some showed the presence of fragments suggestive of dried beef as a constituent; but the proteids in the analysis before the board were not materially in excess of that which would be present were peas or beans the only component. All the samples before the board made excellent soups, but some required to be boiled twenty-five minutes, which is longer than is desirable in an article intended for an emergency ration.

The board has been unable to obtain from those who have manufactured compressed soups in this country as full information as is desirable. The details of the manufacture of these soups being trade secrets, it is impossible on a mere request to secure them. So far as known there have been but three firms in this country who have manufactured these soups, but the demand for them has been so slight that two of the concerns have suspended operations, while the third apparently carries but a small stock.

The board suggests that the attention of the Subsistence Department be directed to the elaboration of a soup-making material of the kind mentioned, and in the meantime recommends that pea meal be adopted for this part of the ration, as a palatable soup can be made from this meal when seasoned with finely chopped bacon, pepper and salt.

Cheese, suggested as a desirable article on account of its high proteids and calorific value, was rejected after a full presentation of the arguments pro and con, and chiefly because it appeared from the evidence before the board that the Subsistence Department had already made an unsuccessful effort to introduce it as an article of food for our troops.

In taking up the consideration of coffee as a part of the emergency ration, the claims of chocolate as a palatable, highly nutritious and easily prepared accessory, were discussed, but on motion it was voted down as failing to give that general satisfaction which is known to be obtained from the coffee ration. From the records it appears that seven of the department boards recommended coffee as a part of the emergency ration. This board concurs in the recommendation, as it believes coffee to be preferred generally in the United States to any other dietetic stimulant. But, inasmuch as tea is recommended by one board and as an alternative by another, as the leaves can be put up in a suitable form, have good keeping qualities, and are more grateful to some tastes than coffee, while the active principle and physiologic action are the same in both, the board recommends that tea may, when called for, be substituted for coffee in the emergency ration.

The board considered the efforts at concentration in the case of coffee to be practically failures, the solid extract having no taste of coffee, while the fluid extracts had more of the taste of chicory than of the aroma of coffee. It therefore decided on recommending that the coffee of the emergency ration consist of roasted and ground coffee berries.

Several preparations of the kola nut, with much manuscript and printed literature on the subject, including recent analyses made in the laboratory of the Surgeon-General's Office, were reviewed by the board; but it regards the whole of this sub-

ject as in the experimental stage and, as such, unfit for serious consideration in discussing the constituents of an army ration.

The question of sweetening the coffee or tea, as between saccharin or sugar, was then brought up for settlement. The department boards were divided on this subject. On behalf of sugar the evidence showed that beside its sweetening power it has a high calorific value. Against saccharin was its novelty; but on its behalf it was found that the practically immaterial weight of 4 grains possessed the sweetening power of 2 ounces of sugar; that it has been used for long periods in much larger quantities than would be needful in an emergency ration with no detrimental influence on health, and that its antiseptic property would tend to lessen the prevalence of diarrhea due to intestinal fermentations. After obtaining full information on these and other points connected with the subject, the board decided on recommending saccharin as the sweetening agent of the emergency ration. The main consideration which led to this decision was the desirability of having a nitrogenous proximate principle in each of the articles which contributed materially to the weight of the ration, and as sugar contains no nitrogen, it was believed that greater efficiency would be obtained if some article containing proteids were substituted for it in the emergency ration.

The advisability of including tobacco among the components of the emergency ration was then considered. It is true that tobacco is not a food; but it is used so generally by soldiers during campaigns for the restful feeling which it induces, that many men would rather go short on food than be deprived of their tobacco. Moreover, those habituated to its use suffer acutely from its deprivation, and as it is the object of an emergency ration to keep up the powers of the individual at their maximum for the time being on the smallest weight of food to be carried, it is argued that half an ounce of tobacco would conduce more to comfort while on short rations than would the addition to the ration of an extra half ounce of bread or bacon. While men who use tobacco always endeavor to provide themselves with it, experience shows that it can not always be purchased during campaigns, and particularly in emergencies; and to the argument that many do not use tobacco, the reply is brought forward that no man will find difficulty in disposing of his portion to others for an equivalent in some other article of the ration.

The board then proceeded to discuss the amount or quantity of the ration as a whole, and of its various components. For the convenience of its members in appreciating the value of propositions in this connection, it prepared the following table as the basis of its calculations:

| One ounce of 437.5 grains. | Nitrogen. | Carbon. | Calories. | Protein. | Fat. | Starches. |
|---|---|---|---|---|---|---|
| | Grains. | Grains. | | Ounce. | Ounce. | Ounce. |
| Biscuit. . . . | 10.71 | 183.5 | 107 | 0.156 | 0.013 | 0.734 |
| Beans. . . . . | 15.96 | 173.1 | 98 | 0.232 | 0.021 | 0.574 |
| Peas. . . . . | 15.13 | 161.6 | 92 | 0.22 | 0.0198 | 0.529 |
| Bacon. . . . . | 6.05 | 273.6 | 203 | 0.088 | 0.733 | . . . . . |

The question whether the emergency ration should be a minimum or bare subsistence dietary or one possessing a high potential energy, was then discussed at length. In this discussion it became apparent that the board was unanimous in the opinion that when emergency rations are issued to troops, it is to be expected that serious work is ahead of them, and that a ration of high calorific value is needful to sustain them under these conditions.

The board recognized that the difference in weight between that which is generally accepted as a standard diet for any ordinary man under ordinary conditions of labor, and the ration which will sustain the soldier under emergency calls to unusual strain is only a few ounces, and the experience of its members authorized the belief that the high condition of the men, resulting from full diet on such occasions, would be bought cheaply by the carriage of the extra ounces on the person. Moreover, the board appreciated that if the emergency did not call for any unusual strain on the physical powers, or if from any cause it became needful to economize during the emergency, the extra ounces of a ration based on a maximum requirement could be withheld from consumption to constitute the ration of a period in excess of the face value of the emergency issue.

Guided chiefly by these considerations, the board decided that the emergency ration should contain as much as the proximate principles of food as is necessary to sustain the soldier under the maximum of physical strain.

It was then decided that the amounts of the various components should be as follows:

| | Ounces. |
|---|---|
| Hard bread . . . . . | 16 |
| Bacon . . . . . | 10 |
| Pea meal . . . . . | 4 |
| Coffee, roasted and ground, with 4 grains saccharin . . . | 2 |
| (Or tea, one-half ounce, with 4 grains saccharin.) | |
| Salt. . . . . | .64 |
| Pepper. . . . . | .04 |
| Tobacco . . . . . | .5 |
| Net weight, with coffee . . . . . | 33.18 |
| Net weight, with tea . . . . . | 31.68 |

It is recommended that the Subsistence Department supply suitable bags in such numbers as may be necessary, for carrying the roasted and ground coffee, and the salt and pepper; also a tough paraffin paper for use in wrapping about bacon when carried on the person; also that the pea meal be issued in compressed cylindrical package.

The nutritive value of this ration is as follows:

| | Protein. | Fats. | Carbohydrates. | Nitrogen. | Carbon. | Calories. |
|---|---|---|---|---|---|---|
| | | | | Grains. | Grains. | |
| 16 ounces hard bread. . . . | 2.496 | 0.208 | 11.744 | 171.36 | 2,936 | 1,712 |
| 10 ounce bacon | 0.88 | 7.33 | . . . . . | 60.5 | 2,736 | 2,030 |
| 4 ounces pea meal . . . . | 0.88 | 0.0792 | 2.111 | 60.52 | 646.4 | 368 |
| Total. . . . | 4.256 | 7.6172 | 13.855 | 292.38 | 6,318.4 | 4,110 |

In determining the quantity of the components of this ration, the board gave due consideration to the various dietaries for hard work, as stated by those who are generally cited as authorities on the subject. In general terms, such dietaries consist of 30 ounces of water-free food having an available energy equivalent to about 4,000 calories. The emergency ration recommended provided 4,110 calories from $25\frac{3}{4}$ ounces of water-free food. This greater food value from a less weight of material is obtained by an increase in the fat of the ration as compared with that of the standard dietaries. It must be remembered, however, that these dietaries are not intended for temporary, but continuous use. They express the views of the physiologists and scientists concerning the waste of the system under conditions of hard labor, and concerning the quantity and character of the food elements needful to completely repair their waste. The emergency ration is not intended for continuous use. It is intended to be used only occasionally and for short periods. The necessity of having it in the exact proportion of the proximate principles required by the system is not imperative. The objective in its construction should be the largest food value in the smallest weight. Fat has an available energy of more than twice that of an equal weight of of the proteids or carbohydrates. The amount of fat assimilated by the system varies not only with the conditions as to heat and cold and rest or labor, but also with the quantity of carbohydrates in the diet. If the carbohydrates are not to be had, fat in excess of that ordinarily assimilated will be utilized by the system. Any deficiency in the proteids and starches of the emergency ration recommended above is offset by the higher calorific value of the fatty element. The fat, however, can not take the place of the proteid principles in the repair of the muscular system. This has to be considered from another point of view. A standard dietary for hard work should have at least 4.4 ounces of the proteids, equivalent to about 300 grains of nitrogen, for the average nitrogenous waste of the system amounts to about this quantity. The standard diet calls for a larger proportion, but it is questionable whether this is not a concession to meat-eating habits rather than a necessity of the system. The emergency ration above recommended gives close upon the quantity needful to repair muscular wastes. Should there be a deficiency it could be made up by meat issues when the emergency is at an end.

The board is called upon to report upon the minimum amount of articles of food necessary to sustain a soldier in health and activity while in active service in the field for a limited period. In considering this subject the board recognized that the wear and tear of the human machine involved in the mere act of living, *i.e.*, in keeping up the vital processes and in sustaining the heat of the system at its normal degree, required the expenditure of a certain amount of energy. To supply this energy a corresponding amount of food must be introduced into the system, and this amount is usually spoken of by physiologists as subsistence diet. The quantities are stated somewhat differently by different authors. The lowest figures are those of Playfair, who calls for 14.5 ounces, of which 2 are protein, 12 starches, and 0.5 fat, containing 138 grains of nitrogen, 2,975 of carbon, and having the available energy of 1,758 calories. The board believes from the evidence before it, and as the outcome of its discussions on this subject, that men in well-fed

and healthy condition at starting can undergo the ordinary fatigues and hardships of an active campaign for at least ten days on the equivalent of a subsistence diet, such as that given by Playfair, and without any impairment of health resulting from the temporarily restricted diet. Hence, if the emergency should require economy in the use of the emergency ration, the men could be put upon a limited dietary, so that in the direst emergency, rations for five days might be made to last ten. The troops would individually suffer loss of weight by having to supplement their deficient dietary from their own tissues, but repair in sound men would be effected by a few days of rest and full diet.

The board considered from its experiments that emergency rations for five days should be the maximum number of rations to be carried on the person of the soldier. In emergencies of less than five days the troops should be required to carry the full ration for the number of days stated. In emergencies of longer duration the commanding officers may direct economy in the use of the ration, so that the five days' rations may be made to last for any number of days not exceeding ten. From their character as issued the articles of the ration are susceptible of accurate subdivision, by which means they may be used with any degree of liberality between a minimum of subsistence diet and a maximum emergency of hard labor diet.

Respectfully submitted,

CHAS. SMART, Major and Surgeon, President; C. A. WOODRUFF, Major and Commissary of Subsistence; E. A. GARLINGTON, Major and Inspector General; L. A. CRAIG, Captain, Sixth Cavalry; W. C. BROWN, First Cavalry, Recorder.

WAR DEPARTMENT,
SURGEON-GENERAL'S OFFICE, Washington, May 5, 1896.

*Sir*:—I have the honor to forward herewith the summary of proceedings of a board of officers convened by paragraph 3, Special Orders No. 74, Headquarters of the Army, Adjutant-General's Office, March 28, 1896, "to consider and recommend a proper ration for troops operating in emergencies."

Accompanying this will be found the daily record of proceedings and its appended papers. Respectfully,

CH. SMART, Major and Surgeon, U. S. A., President.

The ADJUTANT-GENERAL, U. S. ARMY, Washington, D. C.

[First indorsement.]

WAR DEPARTMENT, October 6, 1896.

Respectfully referred to the Major-General Commanding the Army for remark. DANIEL S. LAMONT, Secretary of War.

[Second indorsement.]

HEADQUARTERS OF THE ARMY, Washington, Nov. 11, 1896.

Respectfully returned to the honorable the Secretary of War.

The report of the board as contained in the summary of its proceedings is approved, and the adoption of the recommendations contained therein is advised.

NELSON A. MILES, Major-General, Commanding.

[Third indorsement.]

NOVEMBER 21, 1896.

Approved. DANIEL S. LAMONT, Secretary of War.

[Fourth indorsement.]

HEADQUARTERS OF THE ARMY, Washington, Nov. 24, 1896.

From the Major-General Commanding to the Adjutant-General for publication, with the orders and instructions to carry it into effect. SAM'L BRECK, Ass't Adj.-Gen.

---

General Orders, No. 49. } HEADQUARTERS OF THE ARMY, ADJUTANT-GENERAL'S OFFICE, Washington, Dec. 5, 1896.

1. The following order has been received from the War Department:

WAR DEPARTMENT, Washington, Dec. 5, 1896.

Under the authority vested in him by section 1146, Revised Statutes, the President hereby establishes an emergency ration for troops operating for short periods under circumstances which require them to depend upon supplies carried upon their persons. Its component parts are as follows: Bacon, 10 ounces; hard bread, 16 ounces; pea-meal, 4 ounces, or an equivalent in approved material for making soup; coffee, roasted and ground, 2 ounces, or tea ½ ounce; saccharin, 4 grains; salt, .64 ounce; pepper, .04 ounce; tobacco, ½ ounce.

DANIEL S. LAMONT, Secretary of War.

2. The Secretary of War directs that this emergency ration be resorted to only on occasions arising in active operations when the use of the regularly established ration may be impracticable; that, although its nutritive qualities permit its use on half allowance, it will not be so used except in cases of overruling necessity, and never for a longer period than ten days; and that not more than five days' emergency rations be carried on the person at one time.

3. By direction of the Secretary of War, the Subsistence Department will provide tough paraffin paper for wrapping the bacon; will furnish hard bread in grease-proof packages, the pea meal in cylindrical packages, and the coffee, tea, saccharin, salt, pepper and tobacco in suitable packages.

By command of Major-General Miles:

GEORGE D. RUGGLES, Adjutant-General.

**A Liberal Mayor.**—The Earl of Derby, who is the Mayor of Liverpool, does not draw his $10,000 worth of honorarium, but causes it to be passed over to the support of charitable objects, chiefly to hospitals and dispensaries.

**New Process of Wood Engraving.**—The wood is coated with varnish and the design drawn on this. The acid bath is made of four parts sulphuric acid, one part bichromate of soda and six parts of water. The impression is said to resemble closely aquafortis engraving.—*Nouv. Remèdes*, October 24.

**Cessation of the "Union Medicale."**—After fifty-one years of dignified existence, the *Union Médicale* ceases its publication with this year. The three principal editors, Richelot, Richardière and Eugene Rochard, join the editorial staff of the *Bulletin Médical*.

**Rodent Ulcer; a Genuine Case.**—At a surgical clinic a few days ago, before a class in the Harvard Medical School, a patient was shown who had a wound on the thigh caused by the bite of a rat. The instructor having asked the class for a diagnosis of the case, one of the students replied promptly, "rodent ulcer."

**Mirror Speech.**—Grasset reports a similar case to that of the child mentioned in the JOURNAL December 19, page 1307, who reversed the syllables in speaking. In his case it was a woman affected with hysteria major and since insane, who reversed the letters of the entire words, pronouncing them as if spelled backward with absolutely amazing rapidity and correctness.—*Progrès Médical*, December 5.

**The New Element "Lucium."**—The discovery of a new element to which is given the name "lucium," has been announced by M. P. Barrière. It has been found by him while investigating monazite sand. It is related to the other rare elements found in monazite and is distinguished from cerium, lanthanum, didymium, thorium, zirconium, yttrium, ytterbium and erbium by its chemic reactions. Mr. Barrière's announcement is confirmed by several other competent chemists. Its atomic weight is given as 104.

**Aerial Convection of Typhoid Fever.**—An epidemic of fever at Rheims among the dragoons was first traced unmistakably to the dust stirred up by their evolutions and Uffelmann's experiments demonstrate that the dried typhoid bacillus, as also the cholera microbe, can be disseminated in the air, and thus alight in dust on articles of food. Similar experiences are reported from Belgium as the cause of the present slight epidemic at Tirlemont. These facts tend to show that the water supply is not always to blame in epidemics of typhoid fever.—*Journal d'Hygiène*, October 29.

**Double Monsters.**—The *Journal des Sciences Méd. de Lille*, the organ of the Roman Catholic University, has been devoting considerable space lately to a study of this subject, in order to determine whether baptism should be administered once or twice to a double monster. It concludes that there are always two embryos, hence two souls, but that sometimes one dies in the uterus and its body becomes therefore merely an appendage of the other, a parasite, which of course does not require baptism.

**International Congress at Moscow; Program of Surgical Section.**—1. Treatment of septic wounds. Address by Braatz of Königsberg. 2. Non-operative treatment of neoplasms, especially with sero-therapy. 3. Cerebral surgery in tumors of the brain and Jacksonian epilepsy; Bergmann of Berlin. 4. Surgery of the lungs, especially in pulmonary cavities; Tuffier of Paris. 5. Treatment of strictures of the esophagus and rectum, results

obtained by the different methods of intervention; Czerny of Heidelberg. 6. Syphilitic and gonorrheal arthritis; Ollier of Lyons. 7. Prothesis of the lower member (consecutive to arthritis, paralysis, congenital luxation of the hip and amputations); Dollinger of Buda Pesth.—*Bulletin Médical*, December 2.

**Photographing Concave Objects in Relief and Vice Versa.**—A paper or plaster cast is taken of the object and this is photographed upside down, with the sensitive plate also reversed. In this way a negative of the cast, which is a negative of the object, is obtained and this when printed, by some optical illusion, produces exactly the effect of the original object, probably owing to our habit of seeing things lighted from above.—Moussard in *Nouveaux Remèdes*, October 24.

**Model Creches.**—The importance and necessity of crêches (infant nurseries) for the children of working women are so generally recognized now that the municipality in some towns establishes crêches as it does public schools, under the supervision of the mayor. There are seven suburbs of Paris thus supplied with municipal crêches and the town of Roubaix has two fine ones that are considered models in every respect. The model crêches, however, are few and far between. A recent communication to the Acad. de Méd. states that there are only six in France that comply with all the requirements of the model crêche in regard to the location, building, sterilization of the milk and not too long delay in using the milk after it has been sterilized, with a suitable isolating room. Three of these six are municipal establishments (Roubaix and Tourcoing). Many have no garden, playground, piazzas nor yard. Every person connected with a crêche should pass a preliminary examination before a competent committee. At Gentilly the personel is selected by competitive examination.—*Bulletin de l'Acad. de M.*, November 24.

**Tick, or Texas Fever, in Australia.**—Texas fever has assumed alarming proportions in northern Queensland, is reported to exist in western Australia, and its further spread is greatly feared by all the Australian colonies. It first appeared in Queensland in 1891, brought by cattle from the northern territory of South Australia. From them and other infected cattle introduced in 1894, the disease spread slowly at first, but latterly in a comparatively rapid manner. The bullock teams and drift stock from the northern territory and the western portion of northern Queensland to the boiling and extract works on the Albert and Norman rivers carried the disease in a southerly and easterly direction to a number of herds in that part of Queensland, inflicting very serious loss; but, as a rule, the losses were not so heavy in the country some distance back as on the coast. The whole of the gulf country from east to west, following generally the twenty-first parallel, has been strictly quarantined since November, 1895, and although this has to a certain extent stayed the spread of the disease, it has not proved thoroughly effective. When Queensland was found to be so badly infected, the legislatures of all the other colonies passed acts providing for their safety. The introduction of cattle, horses, sheep and dogs, also unsalted hides from Queensland, is prohibited absolutely by some colonies, and in others is permitted only after thorough inspection.—*U. S. Consular Reports*, November.

**"Society for the Reconstitution of the Family."**—The Acad. de Médecine of Paris proposes to bestow a medal upon the founder of this society, Mad. Hervieu, a midwife of Sedan, in view of the marvelous results accomplished by it already, with such small financial outlay. Its aims are similar to Governor Pingree's potato patch scheme. It supplies poor families with a plot of ground and seeds to cultivate it and during 1893, its first year, it assisted thus twenty-one families, representing 145 persons, at an expense of less than a dollar each (3 francs, 67 centimes). The results surpassed all expectations, as the families not only supported themselves from the products of the land, but they sold enough to afford them an income. The next year fifty-four families were assisted and a coöperative society was formed of fifteen of the younger members of the families, about 16 years old, who each contributed one franc a month. With this amount land was rented, seeds donated, and at the close of the year the members of the little society had by their labor earned enough money to have each a savings-bank book with 50 francs to his credit. Branches of the society are also established at Brussels, Besançon and Montreuil-sur-Mer, which report similar results. The amount of land allotted to each family is 8 verges or roods for a family of two, about 104 square meters, as a verge equals 13 square metres; 10 verges for three; 12 for four to six in the family, and above this up to 20 verges. Land is selected that the family could purchase later if desired. The society also takes under its moral protection and guidance any child inscribed at birth on its records and keeps it in view throughout its after life. Any one can join the society by paying 50 centimes a month.—*Bulletin de l'Acad. de Méd.*, November 24.

**The Pasteur Institut Under Fire.**—The *New York Medical Journal* quotes with gusto an accusation against the Parisian Institut, fathered by the *Paris Medical Journal*. The complainant, a veterinarian named Eloire of Amiens, made use of the virus of Dr. Danysz, an attaché of the Institut, who he said had "with the usual flourish of trumpets" put on the market said virus for the extermination of rats and mice. Eloire's trials were made "conscientiously," but were failures. He thereupon launches an attack upon the other products of the Institut designed to be used as preventives of diseases of animals which have proved equally inefficacious. This is not the first time, he says, that there has been reason to complain of the products of the establishment founded by the lamented Pasteur. The chicken-cholera "vaccine" was only the starting-point of gross errors, and they have returned to it. The rabbit cholera made a complete failure in Australia in the hands of Loir, a pupil and relation of the master, and last year the anthrax "vaccine" caused Eloire very serious disappointments, so that the mortality in the herd kept on after the inoculation quite the same as before it. Eloire promises to recur to this interesting matter at some future time. In the meantime he remarks that the preventive inoculation of rabies leaves so much to be desired that it is not worth while to insist on it. As for the Danysz viruses, he says, they are a continuance of the unfortunate series of uncontrolled preparations sold for their weight in gold and not worth a nail. He protests that he is far from denying the discoveries of the illustrious master of French science; on the contrary, he says he is one of the constant patrons of the "vaccine-mill," and it is precisely in this capacity that he finds the products of the institute too often lacking in the quality that one has the right to expect in articles obtained from such a source. The above is the gist of the attack upon the successors of Pasteur, and if we were to stretch a point in the use of critical language, we would say that it looks like "small business." However, even the best of us are not harmed by being stirred up occasionally; and perhaps Drs. Roux and Duclaux will find this counter-irritant of the Amiens veterinarian an incentive to even greater care, better etiquette. This appears to have been open to review to an avoidance of commercialism, in a word, to the purely scientific attitude of their illustrious teacher. Upon his memory none of these complainants have returned to throw any of their adverse or pessimistic observations; the work of Pasteur has thus far passed unchallenged by these writers to whom we have above referred.

**Communications and Evidence as to Abortions.**—The statutory law of Iowa is that: "No practicing attorney, counselor, physician, surgeon, minister of the gospel, or priest of any denom-

ination, shall be allowed in giving testimony to disclose any confidential communication properly entrusted to him in his professional capacity and necessary and proper to enable him to discharge the functions of his office according to the usual course of practice or discipline. Such prohibition shall not apply to cases where the party in whose favor the same are made waives the rights conferred." Under this provision, two or three important questions were raised in the case of State v. Smith, decided by the supreme court of Iowa, Oct. 9, 1896. The defendant, a lady physician, was being tried on a charge of having produced a miscarriage on a pregnant woman. After she had treated the case for nine or ten days, according to her testimony, to prevent a miscarriage, and finding the head of the fetus in the vagina, and believing that a miscarriage could not then be prevented and that the obstruction must be removed, and having no instruments, she sent for another physician, who refused to have anything to do with the case, advising that nature be allowed to take her course. This second physician was called as a witness and asked to state what he saw and did there in the presence of the defendant. The patient waived any question of privilege and consented that the testimony of the witness might be fully given. This the defendant objected to on the ground "that the things he saw and the conversation he had with this defendant, upon the occasion of the visit mentioned by him, were confidential and that the knowledge he obtained upon that occasion was obtained in his capacity of a physician." The communication in question was not from the patient, nor did the relation of physician and patient exist between the witness and her, says the supreme court, as he declined to have anything to do with the case. The prohibition of the statute, it therefore holds, was not in favor of the patient and she could not waive the same. The prohibition of the statute, the court goes on to state, is not limited to communications with the patient, but applies to all communications of the character indicated in the statute, from whatever source, and is surely applicable, in all its force, to communications between physicians attending or consulting in the same case. At the same time, the court holds that as it was evident from the undisputed facts and testimony of the physician called in that the communication of the defendant physician to him was for an unlawful purpose, and had for its object the commission of a crime, it was therefore not privileged under the statute. The court further holds, in this case, that as there is no provision in section 3864 of the Code for punishing a pregnant woman upon whom criminal miscarriage has been produced, as it has never been held in that State that she is subject to punishment, and as the courts of many of the States have held that she is not an accomplice, and that corroboration of her evidence is not required to sustain a conviction, it will not require such corroboration, and affirms a conviction of the defendant here.

**The Case of Marin Le Marcis.**—In the year 1601, before the high court of Normandy, at Rouen, one Marie le Marcis was charged with creating a scandal, in that having for twenty years been dressed as a woman, she had called herself Marie and wished to assume man's dress and to marry another woman, the widow Jeanne le Febvre. After hearing the depositions of the principals, the court ordered that le Marcis be examined by two surgeons; a second visit was made by a physician, an apothecary and two more surgeons. Both these committees reported that the individual in question was undoubtedly a woman, whereupon the court condemned Marie le Marcis to do penance barefoot before the Church of St. Savior and afterward to be burned alive. Le Marcis appealed from this sentence, so a third commission was formed, consisting of the "oldest doctors, surgeons and midwives exercising in that city." One of the six doctors, two surgeons and two midwives making up this committee was Maistre Iaques Duval, to whom we owe an account of this *cause célèbre*. Jean Riolan, the celebrated anatomist and physician to Marie de Medicis, claimed that all dwarfs, giants and people with six fingers and others of nature's freaks should be put to death to improve the race. The majority of the committee seemed to be of his opinion, for Duval complains that they stood aloof with their hands in their pockets, while he carefully examined the case manually and visually. As a result of his examination he concluded he had to deal with a "gunanthrope" or as we call it, a hypospadiac. Although the rest of the commission dissented from Duval's views, the court of appeal sided with him and the prisoner was released. Maistre Duval having his attention attracted by this *lusus naturæ*, set to work to justify his opinion in this case and if possible to collect similar cases. After a decade of investigation he gave his researches to the world.[1] As might be expected from the times, the work is a queer mixture of credulity and erudition. A picture of the author, aged 56, is found in front, dressed in the quaint garb of his day. He has a benevolent face and a high forehead furrowed by thought, and although the artist has represented one eye as much lower than the other, we feel certain this is a mistake. After passing in review the anatomy of the male and female genitalia, with some very creditable cuts, the author treats of normal labor, the Cæsarean operation and care of the newborn child. The last third is taken up with an account of hermaphrodites, the man who had horns growing from his head, the man who was born with the golden tooth, etc., together with a detailed account of the le Marcis case, with his examination. The work is liberally garnished with quotations from Juvenal, Ovid, Martial, Horace and from contemporary writers, as Bauhin and Paré, which prove the author to have been a man of much learning. Maistre Duval finishes the work by casting the horoscope of Marin le Marcis, who was born Oct. 15, 1579, and proves to his own satisfaction that the conjunction of the planets at his birth was under the influence of the malign Mercury and the sad Saturn, but that joyous Venus finally rescued him. This was not M. Duval's first incursion into the field of letters, for he had previously published two works.[2] His account of the Marcis case led to a controversy with Riolan and to a fourth work.[3] One wonders what was the after-history of Marin and Jeanne, whether they were married and lived happily ever afterward, or not. All honor to Maistre Iaques Duval, Escuyer, Seigneur d'Ectomare and Houel, who rescued a fellow-man from premature cremation and has transmitted an account of his deed to posterity.

**Changes in Maryland Law as to Practice of Medicine.**—Sections 54 and 56 of Article 43 of the Maryland Code of Public General Laws, entitled "Health," sub-title "Practitioners of Medicine," are amended by chapter 194 of the Laws of 1896, which also adds four new sections, numbered 61, 62, 63and 64, to said Article. Section 54, as amended, provides that every person who was practicing medicine in the State on or before June 1, 1892, shall be entitled to be registered as a physician or surgeon, or both, upon making application to the president of either board of State medical examiners, the application to be in writing, sworn to, and state that the applicant was a duly qualified, lawful practitioner of medicine, in good standing, actually engaged in the practice of such profession in the State, on or before such date. Any president of such board, to whom an application is addressed, may in his discretion make inquiry and examine witnesses under oath as to the truth of the statements contained in such application, for a permit to be registered; and if the president of either of such boards of

[1] Des Hermaphrodites, Accouchemens des Femmes, et Traitement par Maistre Iaques Duval, Escuyer, Seigneur d'Ectomare & du Houel, Docteur & Professeur en Medecine, natif d'Eureux, demurent a Rouen, MDCXII.

[2] Hydrothérapie des Kontaines Médicinales aux Environs de Rouen, 1603, et Méthode Nouvelle de Guérir les Catarrhes, 1611.

[3] Réponse du Discours fait par le Sieur Riolan contre l'histoire de l'Hermaphrodit de Rouen, 1615.

medical examiners shall act upon such application, and shall refuse the same, then no president of the other of such boards shall entertain or act upon any application of such applicant for such permit. A permit is to be signed by the president and countersigned by the secretary of the board, and then registered by the clerk of the county where the applicant resides, or with the clerk of the circuit court of Baltimore, if he resides in that city, a certified copy of registration under the seal of the court being made legal evidence of such registration. But the provisions of this act are not to apply to those practicing medicine in the State prior to June, 1892, and who registered prior to July, 1894. Section 56 is amended by making it apply only to physicians who "shall hereafter come" into the State; by omitting the condition that they shall "have been practitioners of medicine or surgery for more than ten years prior to the date of the application;" and by extending the application of the section to any physicians or surgeons from other States "having a certificate or license from a board of medical examiners of any State where the requirements for practice are equal to those required by the board named in this article." Section 61 provides that any citizen of Maryland having information which causes him to believe that any person has been heretofore wrongfully and improperly registered as physician or surgeon, or both, may petition to the court wherein such registration was made, that the name of such person be stricken from the registry of physicians. Upon the filing of such petition, the court or one of the judges thereof shall pass an order requiring the person therein mentioned to answer the same under oath, on or before a date to be named within thirty days from the date of such order, and to show cause, if any there be, why the prayer of the petition shall not be granted. If no answer is made within the time, or one adjudged insufficient is made, the court shall order the name stricken from the registry. But if the allegations of the petition are properly denied, the issue thus raised shall be heard and determined by the court, subject to the right of either party to demand a jury trial. Moreover, the decision upon such petition shall have no force and effect in any criminal prosecution under this article. Section 62 enacts that the term, "Practicing Medicine or a Practitioner of Medicine," when used with respect to the qualifications of a practitioner or applicant to be registered under this article, shall be construed to mean the "practice of medicine" as a profession or means of livelihood, and by one duly licensed or registered. To this is added the very confusing sentence: "If a license or register by law at the time when such practice is alleged or claimed, or by one otherwise duly qualified to practice medicine, if other qualifications were required by law at such date." Perhaps it was intended to follow after a comma, "(if a license or registration was required) by law at the time when, etc." Section 63 makes it the duty of the secretary of either or both of the State boards of medical examiners to inquire into all violations of law under this article, and to institute all proceedings, or prosecutions thereof, and all expenses incurred by any secretary of either of such boards hereunder, shall be paid out of the funds acquired by or belonging to such boards respectively. Section 64 provides that the said board of medical examiners shall have full control over the expenditures and disposition of the funds collected from the fees and charges authorized to be made under the terms of this article; and shall fix and allow such compensation as they may deem proper for service rendered in the performance of the duties required by this article of members of said board or others, with the full power also to allow and discharge all proper expenses of said board, and any surplus to dispose of as said board may deem for the advantage of the practice of medicine in the State.

### Washington.

Medical Society.—At the meeting of the Medical Society held on the 16th instant the President, Dr. Samuel C. Busey, read his annual address entitled "1896 an Epoch in the History of the Medical Society of the District of Columbia." Dr. Busey made mention of the important medical legislation which had been secured through Congress, mentioning specially the medical practice act, the act regulating the incorporation of medical colleges in the District, and the act relating to the testimony of physicians in courts of law in the District. He also touched on the important legislation in matters now pending before Congress affecting the District of Columbia, viz.: The omnibus sewer bill, the reclamation of the extensive flats about the water course, which at present causes so much preventable disease, and the creation and location of a contagious disease hospital. He further recommended the publication at Washington of a medical journal which would show the immense amount of valuable medical literary work done here in the different societies and medical and scientific departments of the local and general governments. Dr. Busey's untiring efforts in the interest of the Society and its members has made the Society the grand Society which it is today. The annual election of officers takes place on Jan. 4, 1897, and the indications are that Dr. Busey will be reëlected President by acclamation. He has already served the Society as its President four terms.

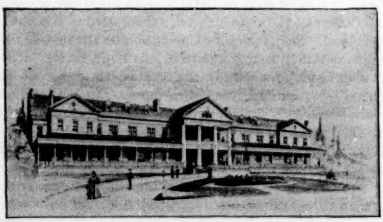
Dental Society Banquet.—The Washington City Dental Society had its thirteenth annual meeting and banquet on the 22d instant.

Washington Obstetrical and Gynecological Society.—The 255th meeting of the Society was held on the 18th instant at the residence of Dr. Wm. P. Corr. Dr. H. B. Deale read the paper of the evening, entitled "Intercurrent Infectious Diseases of Pregnancy."

### Detroit.

Detroit Medical and Library Association.—At the regular meeting of this association, Monday, December 14, Dr. E. Christian, Superintendent of the Pontiac Asylum, read a paper on "Bases for the Study of the Insanities," in which he said that there were four avenues open to us at the present day through which we may approach the study of the insanities: 1, the doctrine of localization of functions in the cerebral cortex; 2, the doctrine of three evolutionary levels of the C. N. S. and the application of the doctrine of evolution and dissolution of functions according to certain definite laws; 3, the doctrine of the "neuron," the unit of nervous and psychic function; and 4, the method of comparative and sociologic investigations, by which light is chiefly thrown upon the various types of degeneration. The first and last methods are well known to most students. A brief study of the second and third will be of interest. In lower animal life, the spinal system includes the gray matter of the spinal cord as far forward as the oculomotor nucleus. Next in order of evolution lie the middle centers, more definite in function than in anatomic limits. They are also sensori motor. On the motor side, they include the two central convolutions, extending along the longitudinal fissure above as well, and include the marginal convolution and also the striate bodies. On their sensory side, the greater part of the temporo-sphenoidal lobe, the gyrus fornicatus and the inferior parietal lobule are offered as fairly well representing the area receiving sensory impressions. Activities are here more complex, less organized and less automatic. The highest centers are situated in the pre-frontal and occipital regions. The activities here are the least automatic. The elements are still sensori-motor, but here we find the seat of consciousness. We have thus divided the nervous system of the animal kingdom into a lowest and highest middle center. Hughlings-Jackson says insanities are dissolutions of these different levels. Using the effect of alcohol as a means, we have first a loss of certain faculties. Later, when dissolution proceeds, the pronounced characteristics of the individual are altered, even so far as to become contradictory. Such results are attributed not to stimulation, but to the suppression of highest levels and the uncovering of levels more and more automatic, now free from inhibition of higher levels. In the case of a mental action accompanying epileptic paroxysms, the same phenomena of "letting go" of lower levels on account of more or less dissolution of higher levels are recognized as

in existence. Delusions in regard to self, which arise in mania or melancholia, are explained on the theory that this dissolution of a higher level does not go on uniformly, but that islets are left here and there of uncontrolled activity, comparable to those which cause dreams in sleep. Neuron is a unit of psychic and nervous force. With the first rudiments of the nervous system we find these sensory and motor neurons. With the acme in the scale of the nervous system, we have an intermediary system of the neurons develop. Thus we have three elementary neurons, the sensory, the motor and the connective. Eight types of nerve cells are recognized in the cortex. The cells of the gray matter which were formerly divided into six layers, are now divided into but four, the molecular layer, the ambiguous layer, the long pyramidal and the polymorphic. The pyramidal and ambigious cells are the oldest in the process of the evolution of the cerebral cortex. In the newborn and young, and while the individual cells of the various cortical layers have already reached the completion of their numerical growth the individual neuron has by no means reached the acme of its evolution. The cell increases in size and processes and also in amount and complexity of its anatomico-physiologic connections. The material pathologic bases of the insanities furnished us by the neuron theory arrange themselves into two groups; the first arising out of alterations or defect in the early evolutions in brain and mind, such as has just been referred to; second, lesions in the protective or nutritive mechanisms. In concluding his researches, our author says: The whole of the above body of neurologic and pathologic evidence together with recent experimental work, show that in the early stages of the insanities there is a profound nutritive and dynamic failure of the nerve elements of the brain, which finds expression in the insomnias, the melancholias and the commencing loss of memory, easily induced mental fatigue; and that the pathologic facts ascertained, in so far as they afford us any light, force on us the conviction that we are dealing with serious nutritive and dynamic changes in a central nervous organ; a conviction which must profoundly influence the clinical and practical treatment of insanity in the future more than it has in the past.



THE MT. CLEMENS HOME FOR INVALIDS.

THE MT. CLEMENS HOME FOR MEDICAL AND SURGICAL INVALIDS.—The property for the erection of a hospital for the treatment of such cases as go to Mt. Clemens and who need medical or surgical treatment, for which the hotels do not supply the necessary facilities, was bought about four years ago by Dr. C. C. Yemans of Detroit. The site is a very desirable one, being healthy, well shaded, well watered and with pure drinking water of a uniform temperature the year round. Work was commenced late in the summer for a building 50x200 feet, two stories in height and so constructed as to give the best possible service with the least running expense. The foundation has now been completed and the executive building is ready for occupancy. The building includes exercise rooms for gymnasium and other amusements for the separate sexes. Not long ago it became apparent that there was not sufficient capacity in the State for the care of nervous diseases, and it was therefore determined to finish the building with a view to caring for such cases. The site consists of eight acres of land. It is healthful, well drained and well calculated for a launch for all kind of exercise and sport, such as football, tennis, etc., within the bounds of its own property. The location is a height on North Avenue, just far enough from the center of business to be quiet and secluded. The building is on the old colonial style of architecture, presenting a home-like and beautiful outline, the whole outfit costing from $30,000 to $32,000. It is expected that the building will be completed and ready for occupancy not later than June 1, 1897. Up to the present time the enterprise has been carried on by Drs. Donald McLean and Yemans. It will now become a stock concern at $40,000 capitalization. It is thought no better location could be selected than Mt. Clemens, especially since it is connected with Detroit by rapid railway, bringing the hospital and the city of Detroit within an hour and a half's time of each other. Mt. Clemens is known to be one of the prominent watering places in America, having a full and elegant service of bath houses and hotels. This enterprise is entered into for the purpose of establishing a pure and simple hospital, with no effort on the part of those interested to supply mineral baths, trusting to those already there for any such needed auxiliary, as they are equal to any bath houses in the world. The hotels are adequate for the comfort and convenience of all who need only hotel service. The hospital is soliciting the patronage of those who are unable to get the required service at the hotels.

THE WEEKLY REPORT OF THE HEALTH OFFICE show 97 deaths last week, of which 48 were children under 5 years of age. There were 53 new cases of diphtheria, with 47 now sick. There are at present 39 cases of scarlet fever and 60 cases of measles. There were 14 deaths from diphtheria. Births during the week 92, of which 45 were males.

THE WAYNE COUNTY MEDICAL SOCIETY, at its regular meeting, Thursday, December 17, listened to an interesting paper by Dr. Charles D. Aaron, entitled "Chronic Dyspepsia and Chronic Catarrh of the Stomach," it being one of the series that the Doctor had read before the different medical societies of the city.

## THE PUBLIC SERVICE.

**Army Changes.** Official List of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from Dec. 12 to 26, 1896.

Major Clarence Ewen, Surgeon, extension of leave of absence granted on account of disability is still further extended until Jan. 24, 1897, on account of disability.

First Lieut. Benjamin Brooke, Asst. Surgeon (Ft. Thomas, Ky.), leave of absence granted for seven days is extended twenty-three days.

**Change of Address.**

Bonner, Horace, from 11 S. Ludlow St. to 119 S. Ludlow St., Dayton, O.
Kellogg, G. M., from Chicago to Keokuk, Iowa.
Norton, J. J., from Monroe City, Mo., to Biloxi, Miss.

**LETTERS RECEIVED**

Abbey, C. D., Chicago, Ill.; Andrews, E. H., Denver, Ind.; Alta Pharmacal Co., St. Louis, Mo.; Anheuser-Busch Brewing Association, St. Louis, Mo.
Broadstreet, S. C., Mt. Pleasant, Texas; Brown, E. J., Minneapolis, Minn.; Bovee, J. Wesley, Washington, D. C.; Bovinine Co., The, New York, N. Y.; Brown, Bedford, Alexandria, Va.
Collins, T. Shields, Globe, Ariz.; Coe, Henry W., Portland, Ore.
Dennis, Frederic S., New York, N. Y.; Dudley, L. W., Alma, Mich.
Elliott, A. R., New York, N. Y.; Erwin, A. J., Mansfield, Ohio.
Fletcher, M. H., Cincinnati, Ohio.
Galloway, D. H., Chicago, Ill.; Garnett, J. W., Greenville, Texas; Grady, L. B., Atlanta, Ga.; Green, R. W. Geneseo, N. Y.
Hummel, A. L., Advertising Agency, New York, N. Y.; Harrington, C. E., New York, N. Y.; Heppner, A. H., Brooklyn, N. Y.; Haldenstein, L., New York, N. Y.; Hulett, C. M. T., Kirksville, Mo.
Jones, J., S. Evanston, Ill.; Jenkins, J. F., Tecumseh, Mich.; Jelks, J. T., Hot Springs, Ark.; Jones, H. Isaac, San Francisco, Cal.; Jacobson & Co., Cincinnati, Ohio.
Kress & Owen Co., New York, N. Y.; Kindred, J. J., New York, N. Y.
Lord & Thomas, Chicago, Ill.
Manley, W. C., Jacksonville, Ill.; Moore, N. W., Milford, Ky.; Mellier Drug Co., St. Louis, Mo.; Monosh, D. F., Des Moines, Iowa.; Mackie, J. M., Portage La Prairie, Canada; McEnaney, J. B., Ashton, Iowa; McIntosh Battery and Optical Co. (2), Chicago, Ill.; Mc assy, J. H., Dayton, Ohio; McBride, M. A., New Orleans, La.; McKesson & Robbins, New York, N. Y.
New York Post-Graduate Medical School and Hospital, New York.
Pugh, Thos. B., Napoleonville, La.
Roe, John O., Rochester, N. Y.; Roush, L. F. New Haven, W. Va.
Simpson, Frank F., Pitrsburg, Pa.; Sheldon, Chas. S., Madison, Wis.
Thompson, F. D., Fort Worth, Texas.
Union Advertising Agency, Louisville, Ky.
Van Note, W. B., Lima, Ohio.
Winslow, R., Baltimore, Md.; Williams, Chas., Syracuse, N. Y.; Waggoner, L. T., Otterville, Ill.